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NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. Articles written by Mr. RAYMOND will be signed thus *
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THE LITTLE SILVER DOLLAR.

The efforts to depreciate the currency are bearing their natural fruit. No one will buy our new bonds, and they are coming back from Europe in immense quantities; within a week probably more than ten million dollars' worth having been returned. The consequence of this is simply that we have to continue paying the higher rate of interest required by the old bonds, and the people are taxed that much more to provide it. Silver dollars, worth from ninety to ninety-five cents, are being freely used to pay wages and generally to pay the poor their scanty incomes; but merchants, finding that the banks will not receive these "little dollars" at their face value, are everywhere increasing the prices of goods to make up the difference and have a little over. Yet the workingmen allow themselves to be cheated by designing individuals who coin money out of their credulity by making them believe that depreciated currency means plenty of money. They might just as well suppose that they would quadruple their harvest by calling a peck a bushel, or increase the yield of their furnaces by using 2,000 instead of 2,240 lb. for a ton.

This country has arrived at that point where it produces more than it can consume of most of the great articles of commerce, and the surplus which must be exported will regulate the home markets. All foreign trade must be based upon the intrinsic value of the coin as compared with gold, not upon its face value, and no amount of legislation can induce purchasers to give us a gold dollar for a silver dollar's worth of anything. Wages and the small accounts of the poor will be paid in the little dollar, but all large transactions will be settled by special agreement in accordance with the actual value of the coin on a gold basis. The depreciation of the currency will always result in making the poor poorer. In this particular case, the movement was started by the silver miners, and the "rag-money" men, who, finding paper money has appreciated in value—no thanks to them—now seek to pay their debts in dollars which they can buy for ninety cents. The first effect of remonetizing silver would undoubtedly be large importations from Germany and probably other European countries, and such a glut of silver that the market value of that metal would decline below what it has been, and the silver miners themselves would be among the first and principal losers.

THE COAL MINE OF THE FUTURE.

Our esteemed Parisian contemporary, *Le Charbon*, has recently come to us with an elaborately illustrated title-page, intended to represent, we suppose, the Coal Mine of the Future. It is a marvelous production, and we would hesitate to make so bold an assumption were it not that it evidently represents a mine and the title-page of *Le Charbon* should represent a coal mine, while it bears no faint resemblance to any mine of the past or present, so far as our knowledge or experience goes. No doubt our readers would like to know what this French Coal Mine of the Future is to be. The illustration shows the foot of an enormous shaft—timbered up with regular framing—mortised and tenoned apparently. The four corner posts act as guides for a cage in the form of a box with one side open, to admit two mine wagons. The men *and women* go up and down on ladders of the ancient style. The shaft ends on the floor of the gangway—the sump being some 50 or 100 feet away—and a sill runs around between the corner posts which would, to the miner of the present day, seem a slight obstruction to the passage of the wagons, but as the rail-tracks, which run through the gangways, do not extend to the shaft, this would not be so important. A man near the foot of the shaft seems to be working a hand rock drill, and on the opposite side of the shaft and *going away from it* is a car filled with coal and hauled on the usual railroad by two *women* neatly attired, one hauling with straps over her shoulders, and the other pushing the car from behind. Since the gangways are timbered at least twenty feet high—high enough to drive giraffes through them—the employment of *women* to do the hauling is evidently "in the plan." We commend this use of the gentler sex to the attention of the *Sorosis*. As already stated, the lump appears to be a slight depression in the gangway, and an enormous direct-acting steam pump stands, without foundation or bolts, on the gangway floor, close by the water in the sump. This pump of the future presents some very peculiar features worthy the attention of manufacturers. It has one steam cylinder and two plunger barrels in direct line. The suction pipe from the sump leads into the end of the steam cylinder, and the column pipe starts from the air chamber. As the plunger barrel is open at the end this arrangement seems not unnatural. Some of the details of the machinery are also rather curious, such for example as passing a rod which is thicker in the middle than at the ends through a stuffing box, and other novelties of that kind. On the whole, our contemporary has distinguished itself, and deserves notice. But having always had an admiration for the women, *si spirituelles de la belle France*, we confess we were somewhat shocked with the idea of relegating them in the future to a work which in the past has proved so degrading. But if *Le Charbon* says that is to be the lot of its countrywomen, what can we say, except invite them to emigrate *en masse* to this happy land, where the women reign supreme, and have only to say "go" and we go; "do this," and we do it. With regard to the startling novelties in the mine itself, perhaps the most striking is that, apparently, the coal is being brought into, not taken out of the mine. *Va un peu plus doucement, confrere, tant de nouveautes a la fois font mal aux nerfs.*

THE TARIFF BILL.

We have already given in our commercial reports, under their respective heads, the provisions of the proposed new tariff bill. On the whole, it is an advantage over our present complicated system, for it will cost much less to collect, will probably produce more to the Government, and, in most of the industries to which this JOURNAL is devoted, it will have no injurious effect. Thus, for example, the reduction of the duty on pig iron to $5 a ton, or that on steel rails to $22.50, will not permit any greater importations than at present, when they are practically nothing. The reduction of the duty on copper ore and matte to ¼ cent per lb. on the copper contained, will be an advantage, for it will help to build up smelting works, and will admit a class of oxide ores that make an advantageous mixture for our sulphurets. The duty on lead ore is kept so high as to prohibit importation. The increase of the rate on iron ore from 10 per cent. *ad valorem*, to $1 a ton, is very unfortunate, for it deprives us of the advantage of cheap ores from Canada, and of Spanish or Algerian ores, which are specially adapted for steel making. The retention of the 75 cents duty on coal is also, we believe, a mistake, as it will deprive the government of income and increase in certain districts the cost of this important item in manufacturing. On general principles, the country has everything to gain in admitting raw materials free. With cheap breadstuffs, low cost of living, and the remarkable ingenuity and industry of our people, this country will certainly become a great manufacturing nation. We have far greater advantage in encouraging and building up department than in protecting special interests, where, in doing so, we increase the cost of manufacturing to such a point as to curtail the business, and limit the employment we can give to our now idle laboring classes. The new tariff bill, considered as a measure of protection, is more effective than was the old tariff some years ago. No doubt it is unsatisfactory to free traders, but inasmuch as it simplifies the tariff, and admits free some raw materials largely used in manufacturing, it will probably be generally acceptable. Special interests, whose profits will be reduced by it, will naturally oppose it vigorously, but the country is too poor to be taxed generally for the benefit of a few individuals, and the exercise of a little stricter economy, or a little more progressive management will, in most of the special cases, prove a "protection" fully as efficient as that of the tariff.

THE COAL MINES OF OHIO.

We have had before us for some time past *The Fourth Annual Report of the State Mine Inspector* of Ohio for the year 1877, but had not yet had an opportunity to give it the attention it merits. The coal trade of Ohio has found an excellent recorder in Mr. Andrew Ray, the State Mine Inspector, and the volume before us gives many details of value concerning the mining interests of the State, and some very wholesome advice to both the miners and mine owners.

The output of the Ohio coal mines in 1877 amounted to 5,125,000 tons

(probably short tons of 2,000 lb., though it is not so stated in the report. When will we have a national system of weights, that all the world will know what is meant by a ton?) or 4,567,000 gross tons of 2,240 lb. As compared with 4,000,000 tons in 1876 and 4,346,653 tons in 1875, the production of the past year was therefore the largest ever yet made by the Ohio mines. Mr. Ray complains that the accidents and loss of life are not fully reported to him; the law, though calling for the information, imposes no penalty for a failure to give it. This report is, as were also those which preceded it, creditable to Mr. Ray, and from his courage in denouncing abuses, and calling attention to unpalatable though necessary facts, it cannot fail to give beneficial results. Mr. Ray seems to possess characteristics which are essential for the efficient discharge of his delicate duties, and the experience which he has gained in the past four years gives him an immense advantage over any new candidate for the office which he holds. We trust that the politicians of Ohio will have sufficient wisdom to reappoint to so important a position an officer who, during four years, has given general satisfaction by the impartial discharge of these delicate and responsible duties of his office. We shall refer again to the report, which lack of time and space now forbids our noticing. There is room for immense improvement in the system of coal mining now in use in Ohio, and we shall call attention to some points in this connection at an early day.

NEW PUBLICATIONS.

LIGHT: *A Series of Simple, Entertaining and Inexpensive Experiments in the Phenomena of Light, for the Use of Students of Every Age.* By ALFRED M. MAYER and CHARLES BARNARD. New York: D. Appleton & Co., 1878. (112 pages. Price, $1.)

This is the first number of a new "Experimental Science Series for Beginners." The plan is a capital one, and the execution of it, as exemplified in the little volume before us, leaves little to be desired. The leading peculiarities of the book are two. It is so clear and simple that it can be employed for instruction by teachers themselves not familiar with physical science; and it is thoroughly scientific in its method, leading the student to prove for himself facts and laws which ordinary schoolbooks would merely tell him dogmatically, and which he would swallow crudely by memory, not digest and assimilate and thoroughly know by inductive reasoning. Hence the whole book is occupied with a few leading principles, and all the experiments are rigidly subordinated to the purpose in view. Some of them are exceedingly beautiful; but that is incidental only. Their highest beauty is that of pertinency to the inquiry in hand; and from this standpoint we cannot too highly praise the skill and judgment with which they have been selected. There are perhaps twenty-five experiments in all; but these may be indefinitely varied, and the apparatus can also be used in many other ways. Prof. Mayer is a born experimenter, and has had many years' experience in teaching the art of experimenting. A book like this, containing the concentrated result of such a practice, from such a hand, outweighs in value many a ponderous compilation of second-hand science. The beginner, for whom it is designed, will scarcely realize its merit as keenly as will the expert, who appreciates the difficulties of the plan and the ingenuity with which they have been overcome. No more striking proof of this can be given than is afforded by the fact that the whole apparatus required for the experimenter can be made (and, to secure the full intended benefit of the book, should be made) with his own hands, with the exception of a few cheap articles, which, together with the wood, paper and other materials needed, will cost in all $12.40. This includes a simple and effective heliostat, and a water-lantern, equal in the definiteness of its projections to the best magic lanterns.

THE SUBJUGATION OF THE GASES.

The autonomy of the once permanent gases is over. Oxygen had already fallen before the gas-compelling M. Pictet, of Geneva, and the equally gas-compelling M. Cailletet, of Chatillon-sur-Seine. The latter, however, has established himself as a very prince of the power of the air by his conquest of nitrogen, hydrogen, and the mixture of oxygen and nitrogen inspired by our lungs. These stubborn gases have yielded at length to cold, pressure, and M. Cailletet's mandate of condense and liquefy. Should our readers ever be tempted to think of the phrase "airy Frenchman," we hope they will couple with it the remembrance of the remarkable form just given to the airy nothings of oxygen, nitrogen and hydrogen by the brilliant physicists whose names re-echo in our pages.

This splendid conquest enlarges the reign of law magnificently. How it was effected our readers will be prepared to learn from our last week's account of the coercion of oxygen. We gave the first place in that account to M. Pictet; in the following we give it to his rival, whose words we quote:

"I have been following up my experiments on the liquefaction of gases, and I am happy to announce to the Academy that I have succeeded in liquefying nitrogen and atmospheric air. Hydrogen itself furnishes some indications of liquefaction, as I shall presently show, meanwhile I give a few details concerning my experiments:

"*Nitrogen.*—Pure and dry nitrogen, compressed at about 200 atmospheres at +30°, and then suddenly expanded, is completely condensed. First of all appears a substance looking like a pulverized liquid, in little drops of appreciable volume; then this liquid disappears little by little from the walls towards the centre of the tube, forming at last a sort of vertical column, the axis of which follows the axis of the tube itself. The total duration of the phenomenon is about three seconds. These appearances leave no doubt whatever as to the true character of the phenomenon. I first made the experiment at home, at a temperature of −29°, and repeated it a large number of times in the course of yesterday, December 30, in the laboratory of the Ecole Normale, in the presence of many scientific men, among whom were several members of the Academy. The venerated M. Bousingault, whose name I am permitted to mention, was one of the latter.

"*Hydrogen.*—This gas has always been looked upon as the most refractory of gases, on account of its low density and the almost complete conformity of its mechanical properties to those of perfect gases. It was, therefore, with very little confidence as to results that I decided on subjecting it to the treatment which determined liquefaction in all other gases. In my first attempts I failed to perceive anything noticeable; but, as is frequently the case in experimental science, a long habit of observing phenomena gives, by and by, the ability to recognize their signs under conditions which at first obscured them. So it was with hydrogen. Repeating my experiments this very day, before MM. Berthelot, H. Sainte-Claire Deville and Mascart—whose witness I am allowed to appeal to—I succeeded in observing signs of hydrogen liquefaction in conditions of evidence which did not appear doubtful to any of the men of science who saw the experiments. The latter was repeated a large number of times. When operating with pure hydrogen, compressed at about 280 atmospheres and then suddenly expanded, we saw formed an excessively fine and delicate mist, suspended the whole length of the gas, and suddenly disappearing. In spite of its extreme attenuation, the production of the mist itself was considered to be beyond doubt by the scientific observers who watched my experiments to-day. And they had it repeated several times in order to leave no doubt as to its reality uncleared.

"*Air.*—The liquefaction of air is *de facto* demonstrated by that of nitrogen and oxygen. Still, it was very natural to make the liquefaction of air the subject of a direct experiment. As might have been expected, this was completely successful. I need hardly say that the air had been dried beforehand, and freed from carbonic acid. Thus has been confirmed the exactitude of the reasoning of the father of modern chemistry, Lavoisier, as to the possibility of reducing air to a liquid form, producing thereby matters possessed of new and unknown properties.

"In closing this letter to the Academy, let me express my thanks to M. Berthelot, and my beloved master, M. H. Sainte-Claire Deville, for their hearty sympathy and the hospitality with which I have always been received at the laboratory of the Ecole Normale."

This communication of M. Cailletet's was read at the usual Monday meeting of the Academy on the 31st ult., before an audience which felt, if we may borrow Milton's splendid phrase, as if another morn had risen on mid-day Following on the communication from M. Cailletet, was read the following "Vidi" from M. Berthelot:

"M. Berthelot begs to say that he witnessed the experiments conducted by M. Cailletet yesterday and to-day on nitrogen and hydrogen. The liquefaction of nitrogen seems to leave no room for uncertainty after the succession of the phenomena which have been described.

"The observations made on hydrogen yielded signs of liquefaction, which, to his eyes, were not doubtful. They were, however, less complete and more difficult to appreciate than in the case of nitrogen. From their appearance, and the brevity of their duration, they may be compared with the attenuated liquid dust produced towards the end of the phenomena recognized with nitrogen, at the moment when the cloud is vanishing. The extreme tenuity of the liquefied particles constituting this hydrogen mist—a sort of diffused luminosity—as well as their more rapid return to the gaseous condition, accorded entirely with the comparative properties of hydrogen and the other gases.

"That which characterizes M. Cailletet's experiments, and gives them the certitude which belongs to them, is the fact that, in one and the same transparent and limited space, they permit the comparison of the gas in the three successive conditions of a compressed elastic fluid, a pulverized liquid, and a fluid in great part expanded. We must also take into account, in estimating the value of M. Cailletet's experiments, the facility with which each can at once be repeated as often as may be desired, so that each phase of the phenomenon can be reproduced for separate study.

"More, in such a matter, cannot be demonstrated; at least, not until some scientific man, profiting by the recent discoveries, succeeds in isolating in the static condition of stable liquids, capable of being kept permanently under observation, the gases which have been liquefied for the first time by M. Cailletet in a dynamic state, if I may be allowed the expression—that is, in the state of liquids which, momentarily formed under the observer's eye, at once evaporate and escape observation."

While M. Cailletet has been bringing hydrogen and nitrogen into unwilling bondage, M. Pictet has been completing his triumph over oxygen. The *Journal de Geneve* of the 29th ult. gives us the following details of his fourth experiment:

"On the evening of the 27th, M. Raoul Pictet repeated for the fourth time his experiment of the liquefaction of oxygen. At 10 o'clock exactly the pressure gauge, which had gone up to 560 atmospheres, fell in a few minutes to 505, and remained at this figure for more than half an hour, indicating thereby the passage of a part of the gas in the liquid state, under the influence of 140 degrees of cold to which it was subjected. The tap closing the orifice of the tube was then opened, and a jet of oxygen escaped with extraordinary violence. A ray of electric light was thrown upon the conical outflow, and showed that the jet was principally composed of two distinct parts—a central part a few centimeters long, the white color of which indicated the presence of liquid, or, perhaps, solid elements; the other an exterior part, the blue tinge of which indicated the return of the compressed and frozen oxygen to the gaseous condition."

Allusion has been made above to the accuracy of Lavoisier's previsions as to the non-permanence of the gases. The session of the Academy on the 24th ult. was thought fully prepared by M. Dumas for the reception of the intelligence by which it was then startled. Before reading the communications which we laid in full before our readers last week, he read out a passage from Lavoisier's work, in which the following sentences occur: "Were the earth suddenly transported to the cold regions, say of Jupiter and Saturn, the water which now forms our rivers and seas, and probably the greater number of liquids we are acquainted with, would be transformed into solid mountains. . . . . The air, or, at least, a part of the aeriform substances which compose it, would, beyond doubt, cease to exist in the state of an invisible fluid, and this change would produce new liquids of which we have no idea."

M. Berthelot has already found in a circumstance attending M. Pictet's experiment, support for opinions of his own in mechanical chemistry, the acceptance of which has hitherto been found difficult for want of direct proof. He draws attention to the fact that the decomposition of the potash chlorate into oxygen and potassium chloride, an exothermic reaction, not limited by its inverse, is not put a stop to by a pressure of 320 atmospheres. It is probable that the rapidity of the reaction is altered, as well as perhaps the temperature at which it is effected; but the reaction itself does not fail to take place.

In the present and in our two preceding issues, our readers have had laid before them the fullest details of the achievement, the glory of which we may fairly envy our neighbors across the Channel. There now re-

mains only to reproduce the discussion at the Academy on the 24th, as to the priority in success of M. Pictet and M. Cailletet. Our readers will be aware that both these gentlemen are engaged in industrial pursuits, the former being well known as a maker of refrigerating apparatus, and the latter as the owner of large ironworks. The great truth which has been revealed to both did not, however, find them quite babes and sucklings in science. M. Pictet's researches in cold having already won considerable notice, Mr. Cailletet being already an authority on the cognate subject of heat. The official report of the discussion proceeds to say:

M. H. SAINTE-CLAIRE DEVILLE.—M. Cailletet repeated his experiments on the condensation of oxygen in the laboratory of the Ecole Normale on Sunday, December 16. Their success was complete. If the account of them (dated December 2) was not published till to-day (the 24th of December), the reason was that M. Cailletet was a candidate for the place of correspondent given him by the Academy in its sitting on December 17; that he did not care to put in on the 10th, when his testimonials were being examined, scientific work, the results of which had not been confirmed by experiment conducted in the presence of competent witnesses. And on the 17th, the day of his election, he did not think it fitting to publish a fact, important, it is true, but undiscussed in the secret committee of the 10th. Fortunately, however, I had taken the precaution, on the 30th, of sealing and having signed by our perpetual secretary the letter containing both the news of his discovery and the confidential expression of the honorable sentiment by which he was then guided. The priority therefore belongs to him unquestionably. But I ought to say that M. Raoul Pictet's remarkable operations are not in the slightest degree discredited thereby. His *modus operandi* is altogether different from that of M. Cailletet. The freezing process founded on the expansion of a gas or a vapor, a principle which had not hitherto been applied, and M. Cailletet's simple apparatus, indicate instructive experimentation in future researches. It is ten years since, to my own knowledge, that M. Cailletet began to lay the foundations of his present experiments. Being desirous of obtaining, under all circumstances, precise and rigorously-measured results, he prepared, at the cost of long labor, the free air-pressure gauges, the description of which has been published in our *Comptes rendus*, and has carefully studied the thermometric apparatus due to M. Regnault and M. Berthelot. It is therefore with a well-founded repugnance that he now speaks of pressures determined by metallic manometers, and temperatures given by alcohol thermometers. But for his anxiety as to the strict accuracy with which he wished the results of his experiments to appear, he would long since have brought to proof the important facts observed and published by him with regard to gases, particularly the binoxide of nitrogen, carbonic oxide and oxygen.

M. JAMIN regarded the possibility of liquefying or solidifying oxygen as now demonstrated. One experiment is as good as the other. M. Pictet's adds little to M. Cailletet's, since, although the former gentleman was the first to state that he had seen oxygen precipitating itself in a liquid form, the mist perceived by M. Cailletet at the moment of expansion shows that the oxygen had ceased to be transparent, *i*, *e.*, gaseous, and that it had become a solid or a liquid. To have seen the liquid or the mist without having been able to collect either, is one and the same thing. The final experiment is yet to be made; it will consist in keeping oxygen liquid at the temperature at which it boils, as is done with the protoxide of nitrogen, or in the solid state, like carbonic acid, being preserved in this condition by reason of the enormous latent heat required for gasification. Everything gives ground for hoping that the two able experimenters will, each from his own side, approach each other and meet in this final result.

M. DUMAS, after what had been said, considered that the independence of the researches of the two gentlemen in question had been fully established. Pursuing the same object, creating methods and appliances which cannot be improvised, each had arrived by his own road at the same result, neither having any knowledge of his rival's labors. The fact is frequent in the history of the sciences.

M. REGNAULT informed the Academy that he was present five years since at the first preliminary experiments made at Geneva by M. R. Pictet and M. De la Rive with a view to obtain the liquefaction of gases. He had been struck by the remarkable ingenuity of the apparatus.

M. BERTHELOT, while admitting the originality of Mr. Pictet's experiments, observes that the experiments conducted by M. Cailletet on the liquefaction of oxygen are the necessary and foreseen result of the researches of the latter gentleman on the liquefaction of the binoxide of nitrogen, published in the *Comptes rendus* for November 26, itself a sequel of the liquefaction of acetylene (reported on November 5). His experiment on the liquefaction of oxygen during expansion was made on December 16 at the laboratory of the Ecole Normale, before several members of the Institute and other scientific gentlemen, under the amplest conditions of publicity, just a week ago. We cannot, pursued M. Berthelot, refuse to acknowledge the importance of the logical order of the series of experiments above detailed, which have been spread over a period of a couple of months, and have recalled the attention of our learned men to a problem which remained in suspense many years on account of practical difficulties apparently insurmountable. After being the first to show, in an unexpected manner, how probable the solution of this problem was becoming in the hands of experimenters provided with sufficient means for carrying out their experiments, M. Cailletet has been his own first follower, by reducing the greater number of the gases hitherto deemed incoercible, namely, the binoxide of nitrogen, marsh gas, carbonic oxide and oxygen.

What may follow on the occupation of this new ground we are not prophetic enough to be able to say. We may repeat with M. Jamin that the coerced gases, though subjugated, are still to be regarded as more or less prisoners at large until they have been incarcerated within walls of frost, and held in the permanent bondage of stable solidity. But we may point out that not only have M. Berthelot's theories received an unexpected support, but that our old friend the "absolute zero" has been cut loose from his moorings at —273°, and is drifting out probably into the interstellar spaces. Where will he settle?—*Iron.*

BULLION PRODUCT OF GILPIN COUNTY, COLORADO.

By F. F. Fossett.

In an article in your paper of January 19, entitled "The Mines of Gilpin County," the yield of this single gold district for ten years, up to 1869, is given at only $9,000,000, when there is plenty of evidence to show that the yield was nearly double that sum in coin or gold value. In the same article the products of 1869-70 are considerably smaller than Raymond's reports give them. The yield of 1875 is given at $1,775,000, or $240,000 too much, while that of 1876 is given at $1,900,000, or $205,544.78 too little, according to the only figures and statements gathered, and those figures were compiled by me and were published for each year in the ENGINEERING AND MINING JOURNAL.

Gilpin County's product for 1877, as given in this same article, was copied from my annual statement, which appeared in the Central *Register*, and nearly the whole article is calculated on those figures. No other statement has been compiled here other than the above. I have since learned that my figures given in the *Register*, of January 3, were not quite large enough, for the following reasons: It appears that some Chinese gulch miners took away a quantity of gold to China, that Boyd's Smelting Works of Boulder purchased $4,000 worth of "buddled tailings," that the Golden Works obtained $90,000 from Gilpin ores, instead of $80,000, as its agent first reported, all of which should be added to the amount given in the aforesaid statement. More than this, in reducing currency values to coin, 4¾ was taken as the average premium of gold for 1877, when, according to the ENGINEERING AND MINING JOURNAL'S table of the 19th ult., the average premium was very close to 4½. All of the above raise the actual gold product to $2,203,037, coin or gold value, instead of $2,175,975, as previously stated.

THE YIELD OF GILPIN COUNTY'S MINES FOR 1877.

	Gold Value.
Gold	$1,958,485.07
Silver	161,255.38
Copper	82,296.64
Lead	1,000.00
Total	$2,203,037.09

The above came from or through the following sources or channels:

	Tons of ore.	Gold Value.
Gold from stamp mills	140,700	$1,283,132.81
Gold from gulches	.....	45,000.00
Boston & Colorado Works	9,000	779,894.76
Golden Smelting Works	800	90,000.00
Boyd's Works at Boulder	.....	4,000.00
Total	150,500	$2,203,037.00

There was over 6,000 tons of buddled tailings purchased by the various smelting works. The product of the Boston and Colorado Smelting Works at Black Hawk, in 1877, was $2,154,000, currency value, or $2,061,244, coin value. The figures credited to these and other works in the tables above are only such portions of the bullion as came from ores of Gilpin County.

CENTRAL, Colo., January 31, 1878.

MISSOURI LEAD SMELTERS.

Special Correspondence of the Engineering and Mining Journal.

The meeting of southwest Missouri lead smelters, announced in my previous letter, took place on Wednesday, January 30, at Joplin; the most prominent shippers were all present. Writer had to resign as your correspondent in order to be present as a miner, and at the close was given permission to withdraw the resignation to be able to act as correspondent.

The meeting, quite naturally, expressed its disgust with the lead market, as illustrated by Mr. Caswell's report. The greatest harmony prevailed on the subject, and all were determined to do their best to effect a change of programme for 1878, a repetition of that of '77 being considered stale and unprofitable. I do not consider myself at liberty to itemize the views expressed by the individual members; it will suffice to report their general sentiments and the preliminary steps toward the organization of a Mississippi Valley Lead Smelters' Association.

The Missouri smelters are convinced that their soft lead is A No. 1, and ought to find, at all times, a ready market with corroders, at prices representing its value, regulated by production and its costs by consumption and its profits. A combination of producers of the Mississippi Valley District will control the figures of production and cost. Concert of action in regard to sales will feel, or rather search its values. A conundrum is to be solved. The fall of pig lead does not apparently affect the price of the manufactured article. The intrinsic value of our soft pig must rest, therefore, somewhere at half of the net profits of lead manufacturers. I suppose this to be the end in view of our producers. However, they will content themselves with a smaller margin—a margin which will be graded by the amount of money which they may be able to control with lead as collateral. By limiting the movement to a strictly protective policy, imperatively needed, and by avoiding the very kind of monopoly which we complain of in the lead manufacturers, by selling at reasonable profits over cost of production, the capital required for conducting the business of the association on the basis of the present annual production, would be within our reach. There are, of course, speculative minds who may harbor greater plans, but it is impossible that their counsels will predominate at the convention which is called to meet in St. Louis the first Thursday of March next.

Besides the call for the St. Louis Convention of all lead smelters of the Mississippi Valley, the Joplin meeting took no further action than the appointment of committees on permanent organization of the Southwestern Mining Lead Association.

B.

TREE FELLING BY STEAM.

Messrs. A. Ransome & Co., in England, recently exhibited in operation a machine for felling trees by steam. There is a three-horse boiler supplying steam at 50 lb. pressure through a flexible pipe to a 4-inch cylinder, 20-inch stroke, mounted on a bed-plate about 2½×1 foot, pivoted about its centre and moved in the horizontal plane by a worm gearing into a quadrant at the rear end. A long projection of the bed-plate lies against the trunk to be cut; a chain passing around the latter, holding the machine closely up to it. The piston rod has long guides and bears as prolongation a saw, having very sensibly a draw cut like the Japenese saw and like the keyhole saw proposed last year by the editor of the *Polytechnic Review*. The machine is thus readily attached; it weighs but 400 lb. The cut is about 9 inches from the ground. The machine cut through an elm 2′ 9″ thick, in 4½ mintues; breaking a saw because there was no woodman to direct the fall of the tree. (This saw breaking is likely to be a common occurrence unless provided against.) In 6 minutes it was attached again, and in 8 more had cut a 3′ tree. The third tree, 2′ 6′ thick, was sawed through in 7½ minutes. In 7 more minutes a fourth tree, 3′ 6″ thick, was attached to and cut through in 10 minutes. A tree 1′ 10½″ thick was cut in 1¼ minutes. The principal trouble with tree-felling devices has usually been that a good axeman could fell a tree before the machine could be attached. But a machine, if fitted with a double-cutting or M tooth, like that of our American Boynton; would do well in our pineries, and might aid in reviving the now dejected logging interest in our northwest.

A HISTORY OF TUNNELING DURING THE THIRTY-FOUR CENTURIES SUCCEEDING THE REIGN OF RAMESES V.

[Extracts from advance proofs of *A Treatise on Tunneling, Explosive Compounds and Rock Drills*, by Henry S. Drinker, Mining and Civil Engineer. Published by John Wiley & Sons, New York. (Copyrighted.)]

To return to the history of the steam-engine proper. In 1804, Richard Trevethick, foreman of a tin mine in Cornwall, completed a locomotive, which was tried on the Merthyr-Tydvil Railroad in Wales. This machine was imperfectly constructed, and did not last long, but it demonstrated the fact that locomotives could be made practicable. In 1813, George Stephenson commenced the construction of his first locomotive, which he completed in 1814. After this he built others, improving each time, until his "Rocket" took the premium on the grand test in October, 1829, on the Liverpool & Manchester Railroad. Among those who advocated the railroad previously to Stephenson's final success was Dr. James Anderson, who, in 1800, in a work entitled "Recreations in Agriculture," suggested the construction of railroads by the side of turnpikes, and was so minute in his details as to how they should be made, that his description might almost pass for that of a modern railroad. Also, about 1820, Thomas Gray commenced advocating the introduction of a general railway system similar to that now in use, and persevered in its advocacy until he was pronounced insane. Long before the opening of the Stockton & Darlington Railway, iron railways with horse transportation had been in use at the English collieries.

As to the early history of coal transportation we find that "waggons and waines" were used at the English collieries at an early date; for Grey, in his "Chorographia" (1649), says of the coal trade of Newcastle-upon-Tyne:

(P. 19.) "There come sometimes into this river for coales, three hundred sayles of ships."

(Pp. 24 and 25.) "Many thousand people are imployed in this trade of coales; many live by working of them in the pits; many live by conveying them in waggons and waines to the River Tine; many men are imployed in conveying the coales in keeles from the stathes aboard the ships; one coal merchant imployeth five hundred or a thousand in his works of coales; yet, for all of his labor, care, and cost, can scarce live of his trade; nay, many of them hath consumed and spent great estates and dyed beggars. I can remember one of many that raised his estate by coale trade; many I remember that hath wasted great estates."

(P. 26.) "Some South gentlemen have upon great hope of benefit come into this country to hazard their monies in coale pits—Master Beaumont, a gentleman of great ingenuity and rare parts, adventuring into our mines with his thirty thousand pounds; who brought with him many rare engines not known then in these parts; as the art to boore with iron rods, to try the deepnesse and thicknesse of the coale; rare engines to draw water out of the pits; waggons with one horse to carry down coales from the pits to the stathes to the river, &c. Within few years he consumed all his money, and rode home upon his light horse."

"The coale trade began not past four-score yeares since; coales in former times was only used by smiths, and for burning of lime; woods in the south parts of London, and other cities and towns growing populous, made the trade for coale increase yearely, and many great ships of burthen built, so that there was more coals wanted in one year than was in seven yeares, forty yeares by past. This great trade hath made this towne to flourish in all trades."

In these extracts from Grey, however, there is no mention of tramways; these were plainly in use in the north of England in 1676, for Lord Keeper Guildford, who rode the northern circuit that year, thus describes them:* "The manner of the carriage is by laying rails of timber from the colliery down to the river exactly straight and parallel; and bulky cars are made with four rowlets fitting these rails, whereby the carriage is so easy that one horse will draw down four or five chaldron of coal, and is an immense benefit to the coal merchants."

Brand tells us of these wagons in his "History of Newcastle" (1789, vol. ii., p. 687), that "the first waggons are said to have wanted the conveniencies of letting out at the bottom, having been emptied with shovels like the present ballast waggons. It appears by the old books of the Hostmen's Company, A.D. 1600, that the then coal waines contained eight bowls of coal, and some scarce seven bowls. The present waggons contain more than twice that quantity." Also (p. 687) Brand says: "There is a tradition among the people belonging to the coal works that the first waggon that was used for this purpose in the vicinity of Newcastle was lined with tin, and filled with the liquor called punch. It is easy to conjecture that the unloading of such a waggon would prove a very grateful task to the thirsty workmen."

When the "waggon-ways" were first protected by iron sheeting, it is difficult to ascertain positively. In 1610 there was a patent granted to Simon Sturtevant (for thirty-one years) "for divers mechanic arts and mysteries of his own invention, whereby all kinds of workes and materials, as iron, steele, lead.....and such like,.....may bee well made and wroughte with sea coale, pit coale, earth coale and brush fuel, whereof the woodes now generally wasted.....may be preserved."† Also, a patent for founding iron with coal was granted to Simon Startwort in 1622 ;‡ he, however, did not succeed with the business, and we subsequently find § "that there occurs among the projected monopolies of the year 1627 a charter to three persons for the sole practice of their new invention for the melting of iron ore, and making the same into cast works and bars, with sea coal and pit coal only."‖

Tunnels, of course, multiplied rapidly in England with the extension of railways, and during the twelve or fifteen years following the construction of the Liverpool and Manchester line, there were a large number of tunnels built throughout the kingdom, among them being the famous Kilsby, Box and Woodhead tunnels. The first tunnels on a steam railway in France were those built on the St. Germain line in 1837. Subsequently, the ones on the Versailles, the Gard, and the Rouen lines raised the total length of tunnels in France in 1845 to 12,833 m. (42,105 feet.) The report of the Corps des Ponts et Chaussees ¶ on tunnels for 1856, shows at that date a total on French railroads of 126 tunnels, of a total length of 65,106 metres. It also appears that there were then 62 additional ones proposed, of a total length of 41,000 metres, 22,783 metres being actually under construction. Among the noted early French tunnels may be cited the Nerthe, Arschwiller, Rilly, La Motte, Lormont and Alouette. In Belgium, the Cumptieh Tunnel, built in 1835, on the "Chemin de l'Etat," seems to have been the earliest. In Germany (Prussia and other states), the earlier lines were so located as to not require much tunnel-work; and we have seen that the Oberau Tunnel (1839), on the Leipsic-Dresden line, in Saxony, was the first. In Austria, we have seen that Rziha gives the Gumpoldskirch Tunnel as the first. A tunnel at Eriebitz (perhaps the same), on the "North" line, is mentioned in the Ponts et Chaussee Report (above cited) as an early Austrian one. In 1856, there were some 50 tunnels in Austria, of a total length of 13,522 metres. In Italy, the Naples-Castelamare line, opened in 1840, had several tunnels. In 1856, the total Italian tunnels amounted to 10,181 m.; the Bologna-Pistoja line is especially remarkable for its semi-subterranean character. Among the early Swiss tunnels especially to be noted is the Hauenstein, commenced in 1853 and finished in 1858.

The history of tunneling after the construction of the earlier lines is, of course, identical with that of the various railway systems, until tunneling, in the inception of the Mont Cenis Tunnel in Europe and the Hoosac Tunnel in America, entered its last and greatest phase, that introduced by the adoption of machine rock-drills and high explosives. And now it is time that we should turn and trace the history of tunneling on the west of the Atlantic; and to do so, it will be necessary first to take a short retrospect of the early history of canal and railroad engineering in America, and note, in concise form, the dates at which the several States began their systems of internal improvements.

It appears that the first large canal located in the United States was the Schuylkill and Susquehanna (Union Canal), in Pennsylvania, on which work was actually commenced in 1791. In the very early work in Pennsylvania should also be included a canal around the Conewago Falls of the Susquehanna, 1¼ miles long, built by a company chartered in 1793, and executed soon after. Among the early pieces of canal-work in the country should be also noted some commenced and partially finished on the Dismal Swamp Canal, in North Carolina, between 1786 and 1791; also some work was done about the same time on the Potomac, James and Rappahannock Rivers. The Hadley Canal, 2 miles long, and the Montague Canal, 3 miles long, both in Massachusetts, were built by companies chartered as early as 1792; the Santee Canal (22 miles), in South Carolina, was built in 1802; and the Carondelet Canal (2 miles) in Louisiana, was chartered 1805. The Middlesex Canal (27 miles), in Massachusetts, comes next in 1808, then the Champlain Canal, in New York, commenced in 1816 and completed in 1819; and, finally, the Erie Canal (363 miles), in New York, was commenced in 1817 and completed in 1825; the Champlain Canal, above noted, was built in connection with it.

The building of the Erie Canal, a colossal work at any time, and especially so in the early days of the country, gave an impetus to the spirit of public improvement in all parts of the Union. Though New York was the first State, therefore, that had the pluck to put into execution schemes for public improvement on a large scale, there can be no question, on the other hand, that Pennsylvania can fairly lay claim to being the pioneer State in the matter of the early inception of such work. William Penn, in his "Proposals for a Second Settlement in the Province of Pennsylvania," published in 1690, alludes to the practicability of effecting a "communication by water" between the Susquehanna and the Schuylkill.

The matter was revived and agitated in Pennsylvania, between 1750 and 1760, by some energetic citizens, and, in 1762, David Rittenhouse and Dr. William Smith surveyed and leveled a route for a canal to connect the waters of the Susquehanna and Schuylkill rivers by means of the Swatara and Tulpehocken creeks. The Union Canal, subsequently built, was located on a portion of this route, the first one surveyed for a canal in the colonies. David Rittenhouse subsequently held the position of astronomer, and Dr. Smith that of provost, of the University of Pennsylvania.

Duly to appreciate the enterprise of the age and the people, we must remember that the projectors of this route contemplated nothing less than the ultimate junction of the waters of the Delaware with the Ohio and Lake Erie, on a route of some 582 miles, with an elevation of some 3,000 feet at the Allegheny Mountains to overcome; that the scheme was all substantially carried out in time; that this was a day in which the words "engineering" and "capital" were comparatively unknown in the colonial vocabulary; that no canal was then in existence even in the mother country, and the Duke of Bridgewater's navigation was but just begun.

In 1764, the first survey for a canal to connect Chesapeake Bay with the Delaware River was made, and in 1769 a second survey was conducted under the direction of the American Philosophical Society; in this year, the provincial legislature authorized a full survey of the Pittsburgh and Erie route proposed by Rittenhouse and Smith, and there is little question but that had the stirring events of the Revolution not interfered, these projects would at once have been put in execution. On September 29, 1791, the legislature incorporated a joint-stock company to connect the Susquehanna and Schuylkill rivers by canal and slack-water navigation, and in a subsequent act of April 10, 1792, the intention of connecting the eastern with the western and northern parts of the State is distinctly expressed in the act of incorporation of the Delaware and Schuylkill Canal, which was intended to carry out a link in the scheme. Work was begun on these canals, but, owing to financial embarrassments, it was discontinued in 1795. In 1811, these two early charters were united in the "Union Canal Company;" the Delaware and Schuylkill Canal, however, was never completed. In 1819, the legislature (of Pennsylvania) guaranteed an interest of six per cent. on the stock of the Union Canal Company, and, in 1821, operations were resumed, and the canal finally completed in 1827, under the direction of Canvas White as chief-engineer, Simeon Guilford, principal assistant, thirty-five years having thus elapsed from the commencement of the work in 1792, and sixty-five years since the date of the first survey. Meantime, owing to the delay in the completion of this

* "History of Newcastle," Brand, 1789, vol. ii., p. 687.
† Weale's "Quar. Papers on Engineering," vol. v.
‡ "The Coal Regions of Pennsylvania," by E. C. Bowen, 1848.
§ Brand's "History of Newcastle," London, 1789, vol. ii. p. 280.
‖ However, iron-founding in England dates back to the fifteenth century. Charles Wilkins, in his "History of Merthyr-Tydvil," cites an iron plate standing under the hammer-block on the site of an old furnace near Troedyrhiw, which was found to bear the date 1478; also he says further: "One hundred years after this date, a record exists of iron works erected opposite Duffryn Furnace;" and "in the days of Elizabeth (*i. e.* about 1570) iron furnaces were at work about Merthyr, but they all used wood." (British Parliamentary Report on Coal, vol. i., 1871, App. 21.)

¶ Bulletin No. 5, 1856, "Statistiques des Ouvrages d'Art."

work, the Schuylkill Navigation had been completed before it. This work had been commenced in 1815 (the company being incorporated on May 8), and the lower part of the canal, from Norristown to tide-water at the Falls of the Schuylkill, was completed and brought into use by 1821, the whole being completed in 1825. It was an important piece of work, being the outlet for the Schuylkill coal regions, and this canal is of especial interest to us, as upon it the FIRST TUNNEL EVER CONSTRUCTED IN THE UNITED STATES was located. This was the tunnel above Auburn, at the Orwigsburg Landing, commenced in 1818 and opened for use in 1821.**

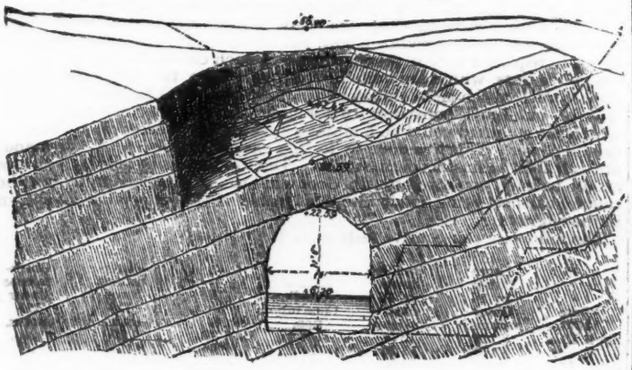


FIG. 8.

Section of the First Tunnel ever built in the United States, located on the Schuylkill Navigation above Auburn. Built 1818-'21. Taken out in open cut as shown by dotted lines in 1855-'56. Scale 30'=4'.

It was cut through red shale 20 feet wide by 18 feet high (from canal-bottom), and was originally 450 feet long; arched for about 75 feet in from each portal. The highest point of the hill over this tunnel was only some 40 feet, and had it been located but a short distance down the ridge where the railway-cut now is, the tunnel might easily have been altogether avoided. This location also would have given a better alignment for the canal itself, for, in fact, in order to get a tunnel, they had almost to turn a right angle to the previous course of the canal, so as to get sufficient height to tunnel under. It is said that the tunnel, from the novelty of such a structure, excited great attention, many people coming in stages and private conveyances from Philadelphia to view it, and that it, in fact, was one of the chief causes in promoting and exciting general public interest in the canal itself. In 1834-'37, the tunnel was shortened to about half its original length; in 1845-'46, it was enlarged in width to 22 feet, and further shortened to a length of only 160 feet, and, finally, in 1855-'56, it was wholly taken out in open cut (the dotted lines in the sections show the slopes), so that our first American tunnel is now "an airy nothing." Even the name of the engineer who located and built it is not known, and the sketch and section in Fig. 8 must stand as the sole record of this first precursor of the art in America, which has given us, in the growth of fifty years, the long line of tunnels to whose history we can look back to-day.

(TO BE CONTINUED.)

WATSON'S AUTOMATIC CRANE.

In *The Engineer* for January 25 is illustrated a crane which has the very remarkable feature that when used for unloading vessels, etc., where the load has to be dropped considerably lower than the level of the stowage, no supply of power from without is needed. Thus if a bale must be raised 20 feet to clear the vessel, and then dropped 45 feet to the wharf, advantage is taken of the fact that each 45 foot-pounds in falling should more than balance the 20 foot-pounds required in hoisting, plus the friction of the crane and tackle. There is a heavy back-balance weight; the bale is let down with a run, and raises this back-balance, which is promptly braked as soon as its upward motion ceases, and is made to yield power enough to raise the next bale. We can only suggest that the crane could for short lifts and deep drops be made to "slow" automatically.

AN IMPROVED SYSTEM OF ALKALI MANUFACTURE.

An improved system of alkali manufacture proposed at Tennant & Co.'s "St. Rollox" Chemical Works is worthy of notice. The ordinary group of processes consists of the following:

1. Making sulphuric acid.
2. Decomposing common salt by the sulphuric acid, producing thereby sulphate of soda and hydrochloric acid.
3. Utilizing the hydrochloric acid for making bleaching powder, chlorate of lime, bicarbonate of soda or sulphur (from the waste in the fourth stage).
4. Converting the sulphate of soda, by decomposition with carbon and carbonate of lime, into carbonate of soda and sulphide of calcium, and separating these two by leaching.

As regards the production of alkali from sulphate of soda, the theory that excess of lime was necessary to the formation of an insoluble calcium compound was dissipated by Gossage, yet in all practical work it has been necessary to use more than the theoretically requisite amount of limestone. The Jarrow Chemical Works patented the heating of the limestone and part of the coal, so as to produce a little caustic lime, after which the rest of the coal was added and the process completed. Elliott & Russell introduced a brick-lined cylindrical iron furnace revolving on bearing wheels, and these, as modified, were of value. Mr. James Mactear, satisfied that the principal reason for the use of excess of lime was that of the insolubility of the black ash, and that this depended very largely on the amount of caustic soda in the liquors, and that again on the excess of limestone used, determined to distribute caustic lime in pieces through the mass of black ash, so that in slacking the balls would be rent in pieces. Mr. Mactear placed in the slowly-revolving furnace the sulphate of soda, with about a theoretical equivalent of carbonate of lime; when all the sulphate is decomposed, pieces of quick-lime are put in, and the furnace rapidly revolved to mix all quickly. There is sometimes added coal or cinders to keep the ball porous.

The above process increases the output 50 to 70 per cent., saves limestone and coal, reduces waste 30 per cent. and gives more alkali per quantity of sulphate of soda. The first item of output saves wages in handling material, and the saving in waste also effects other percentages of economy.

**For the illustrations of this tunnel, the author is indebted to Mr. W. Lorenz, Chief-Engineer Philadelphia & Reading Railroad Company; the dates and general data were kindly furnished, through Mr. Lorenz, by Mr. J. F. Smith, Cons'g Eng'r Canals, P. & R. R. R. Co. (1877).

FIRES CAUSED BY WATER.

The familiar lecture table experiment of "touching off a cannon with an icicle" has its counterpart no less paradoxical, in the actual world, where fires are sometimes (though not frequently) caused by water. In the experiment alluded to, a tiny piece of potassium, by its energetic combination with the oxygen in the icicle, inflames the liberated hydrogen, and thus lights the priming of the cannon. The experiment is a striking one, calculated to make one long remember that chemical combination is a source of heat, and that when two bodies have a *very* intense mutual affinity, they may combine with such fervor as to cause combustion.

Some time ago the *Polytechnic Review* called attention to a case in which fire was caused indirectly by flood—the rising water floating a cotton bale that was in a warehouse cellar until it caught a gas flame, and set fire to the floor, and thus caused the loss of the building.

Recently, at the Amelung fire in Brooklyn, there was a more direct example of fire caused by water, by the energetic combination of the water raised by the high tide and wind, with some quick-lime; the slacking being so vigorous as to cause ignition of the boxes or barrels containing it, and thus causing a serious fire.

These and similar lessons should teach us greater care in storage and greater watchfulness. It is very much doubted whether any lessons or any losses will ever teach Americans *to build fire proof*. Spontaneous combustion of damp hay is not unfrequent; coal, sometimes, if not well enough ventilated, gets smouldering on ship board; grain is liable to the same danger.

Cotton waste and rags, etc., can be ignited if the proper conditions of moisture and confinement exist; and where these are not found, spontaneous combustion, caused by rapid oxidation of animal oils is quite ready to aid in swelling the list of insurance losses.

Not entirely *apropos* of our title heading, may be mentioned fires caused by the rays of the sun, concentrated by means of druggists' bottles, engravers' globes, aquaria, or even bubbles in glass panes—falling in inflammable materials. The water, acting as a refracting material, cause the damage.

G.

MINES OF ALPINE, LAKE COUNTY, COLO.

Correspondence to the Engineering and Mining Journal.

Below find some notes in reference to the present status of affairs in this camp:

The Tilden is now down twenty-five feet, with seven feet between walls, and an ore body of three feet; besides a level run forty feet north to the line between the Tilden and Maramec. They have shipped all their high-grade ore to St. Louis, which runs from one to two thousand ounces per ton. The balance, say about one hundred tons, is on the dump waiting for transportation to works at this place.

A discovery just made, and parallel to the Tilden and Maramec, two hundred feet away, promises to be equally as good. The ore assays in fair average samples from five hundred to one thousand ounces per ton, and the pay is about twelve inches thick. The Tilden will be worked all winter. These mines are all opened about five hundred feet above timber line.

The Minnatonka is now in sixty-five feet with a body of ore from twenty to thirty inches thick, but assays low, say from fifty to sixty dollars per ton, consisting of gold, silver and lead.

The Lilly is in forty feet with a pay-streak of from twelve to twenty inches; this ore assays high, and but for an unfortunate accident occurring to the owner late last summer, would have been much further in; as it is, they have a fine lot of ore on the dump, ready for shipment as soon as trails open in the spring. Work will be kept up all winter.

The Ida is in forty feet, with a large body of ore just coming in from below. Assays show it to be of the best class. The lode is very large, varying from seven to ten feet between walls. This is a new discovery, made late this fall.

The Cosalite Tunnel Company have their engine and machinery for drilling all housed in. For the present, work is being done by hand. They will cut the Ida in twenty feet, at a point one thousand feet south of the present working.

The Topeka Tunnel Company are in sixty feet, and driving ahead as rapidly as hand-drilling can do it. They will have run over one thousand feet more before cutting their first lode.

The Mary Murphy has been idle since November 1, but will resume work in April. About thirty tons of ore are on the dump.

This mine and the Pat Murphy both fall on one claim, and have been worked enough to prove them good paying mines. On the Pat Murphy two levels have been run on the lode, each seventy-five feet in length, all in pay. The Mary Murphy is worked by a shaft and levels run in on the lode also in pay.

The Kansas City M. & S. Co. are adding works for leaching so as to be able to handle the excess of dry ores that at present the mines are producing. With this addition they will be able to treat twenty tons daily, which from present indications there is every reason to believe they can get, from this time on.

The concentrating works of Campbell Brothers will be ready to buy ore next spring. The cold snap caught them unprepared, and work had to be suspended for the winter.

JAS. J. CHAPMAN.

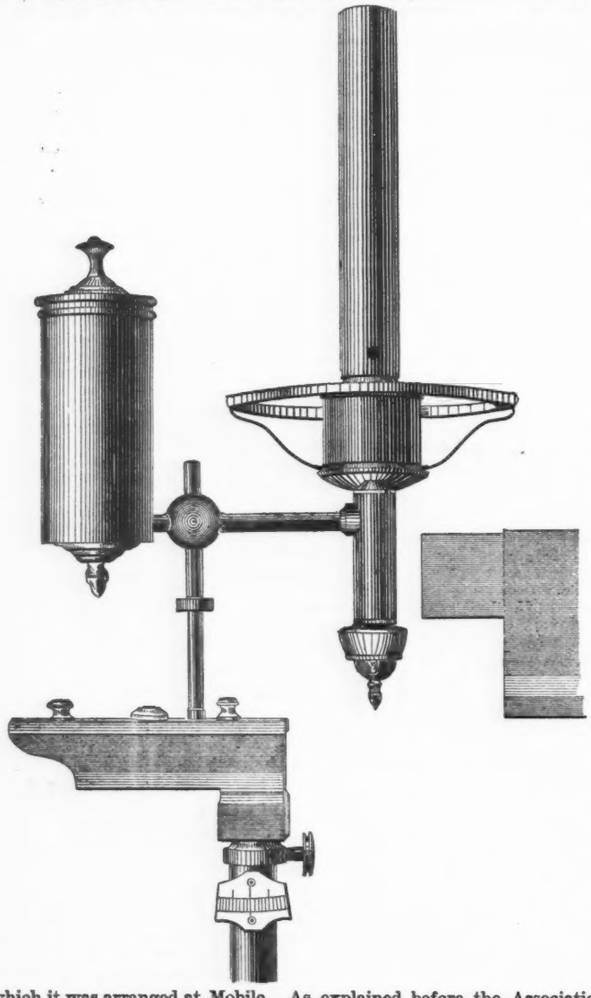
JANUARY 21, 1878.

PHOTOMETRY—THE MOBILE STANDARD LAMP PHOTOMETER.

By H. H. Edgerton.

This instrument was described before the October, 1875, meeting of the American Gas-Light Association. As I had at that time no leisure to devote to a practical test of its merits, it was allowed to rest untested until the autumn of 1876. I had the proper appliances constructed to set it up in Mobile, and in March and April, 1877, was enabled to make not only a pretty thorough investigation with it at Mobile, but was also enabled to test its merits as a portable apparatus.

The engraving, copied from a photograph, represents the manner in



which it was arranged at Mobile. As explained before the Association, the object of the improvement was to obtain a more accurate and reliable standard than the sperm candle at present in use. Many plans to this effect have been proposed, and no doubt some very good ones, if they could be readily carried out.

Some one has proposed pure olefiant gas. That would make a very perfect standard; but the gas would have to be made, purified, compressed into a cylinder, and measured out through an exceedingly delicate meter or gasometer. Mr. Bowditch proposes to carburet carbonic oxide, and measure accurately the carbureting material.

I have seen no experiments reported from the employment of such an apparatus, nor do I believe it would much exceed the candle instrument in accuracy.

After thinking of many plans not necessary to mention, I settled upon the one described to the Association for the following reasons, which were then given:

I wished to avoid all weighing and measuring of the standard, if possible; also to curtail the operation in point of time; also, if possible, to secure a reasonably accurate observation by one adjustment of the sight-box—in order that burners might be rapidly tested; as rapidly, in fact, as it is possible to correctly ascertain the rate of consumption, and, finally, to provide a standard readily attainable by all.

To do this, I adopted the kerosene oil lamp as a standard; but, in place of using the full flame, I only use a very small portion, shining through an opaque disc about one-half an inch in the opening. This principle admits of the use of a flat-flame or a round-flame burner. In Mobile I used the student-lamp burner—not the Hinrichs burner, but the large New York burner, giving a flame of 18 or 19 candles without smoking.

It had first to be ascertained how reliable this standard is under different conditions. First, what difference does the use of different oils make? Second, what difference does a change in the height of the flame make? Third, what difference, if any, is there in a change of chimneys? All the conditions being as nearly as possible the same, what is the accuracy of this standard? To test the first I purchased three brands of kerosene—Pratt's Astral Oil, Partridge's Diamond Oil and Forest City Paint and Varnish Co.'s "Headlight." I ascertained the illuminating power of the same gas (contained in a 100,000 cubic feet holder) with each brand of oil, and found the change of oil made no difference of account. I then took observations, in series of ten each, with different heights of flame, varying from two and one-half to twelve inches. The extreme ranges made a difference of 5 per cent. in the standard, but more moderate variations, made of one-half to one inch, made but trifling difference in the standard. The height is observed through a slit in the copper cover. The glass chimneys were then changed, still making use of the same chimney cover. This was found to give considerable variations in the standard, owing to the fact that no two chimneys could be found perfectly identical. Perhaps if they were carefully made and selected for this particular purpose, the difference would be slight, but never so little in my judgment as not to require a careful standardizing of each chimney. The details of the above tests, which are quite interesting, I have not with me. They are recorded in the Mobile photometer book, and, with some burner tests, will be published hereafter. After ascertaining the conditions under which the standard could be maintained regular, I proceeded to test its candle power. This was done by testing gas alternately with the standard and then against a sperm candle. The candle was burned in a Keates candle balance, improved by Mr. Goodwin—the Mobile standard and the candle balance being made interchangeable on the same pillar, as shown in the engraving.

The following consecutive tests show the results:

Date. 1877.	A. Lamp Power by 10 Observations.	B. Candle Power by 15 Observations.	Rate of Candle Consumption.	B / A	Observations over 115 Grains.	Observations under 115 Grains.
April 13	3·179	13·91	118·4	4·376	4·376	.....
"	3·143	13·70	119·2	4·359	4·359	.....
April 14.....	3·415	14·96	114·4	4·381	.....	4·381
"	3·440	14·79	117·6	4·299	4·299	.....
April 16.....	3·475	14·50	116·0	4·173	4·173	.....
"	3·379	14·83	115·6	4·389	4·389	.....
April 21.....	3·353	13·95	108·0	4·160	.....	4·160
"	3·314	13·49	114·0	4·165	.....	4·165
April 24.....	3·216	13·29	110·8	4·132	.....	4·132
"	3·170	12·73	113·2	4·016	.....	4·016
Mean.....					4·319	4·171
Mean, when candle burned over 115-grain rate.....					4·319	.....
" " " under 115-grain rate.....					4·171	.....

From the above tests I have chosen the five nearest to 1·20 grains candle consumption as representing nearest the truth. These experiments were performed with chimney No. 3, cover No. 1, which in subsequent tests I rate at 4·32 candle power. The standard fulfills the conditions desired in so far that it is readily obtainable, and that it entirely avoids weights and measurements. It remains now to be shown how great accuracy can be anticipated, both for a single as well as for a combination of observations.

To show this, table A is inserted, of which a little explanation may be necessary. The tests made with the three burners named are not corrected for temperature or pressure. The "Referee" burner could not be made to consume 5 cubic feet without smoking, and in fact could not be made to consume any fixed amount, owing to variations of pressure to which this burner is extremely sensitive. The arrangement in the burner for governing did not work well. The meter is placed after the governor, as in most photometers, and hence the very slightest inequality in the movement of the drum was plainly apparent. The meter was made by Gregg, and when new, would, I presume, work perfectly regular. The "Referee" burner gives a beautiful flame, but always inclined to smoke and very sensitive to the slightest draft, even that made by a gentle movement of the body causing it to flare. To ascertain the ultimate reliability of the standard with such a burner would, I believe, require a very delicately-balanced gas holder instead of a meter.

"A."

OBSERVATIONS MADE WITH MOBILE STANDARD LAMP PHOTOMETER.

J. O'Brien, Observer.

Showing Extreme of Deviations to be Expected from Minute Observations.

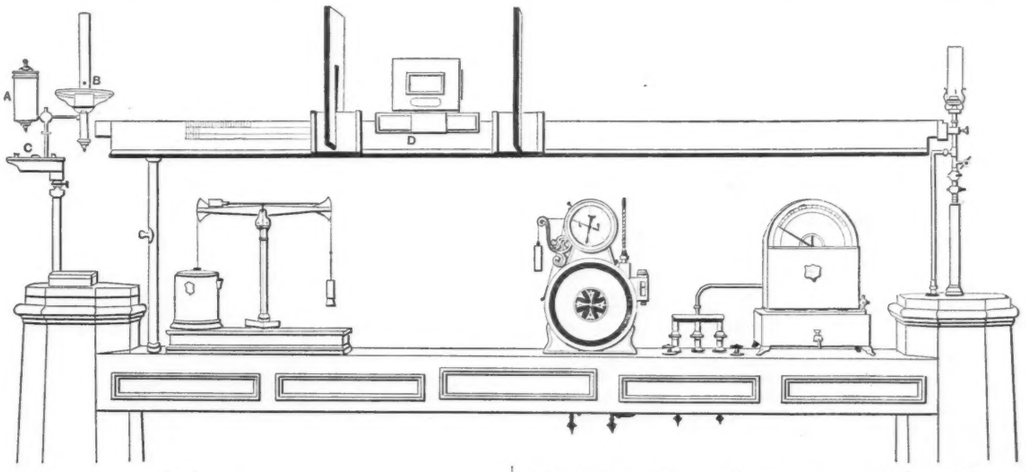
Date. 1877.	Burner.	Lamp. Chimney.	Lamp. Cover.	Temperature, F.	Actual rate Consumption.	Lamp Power, Mean of 10 Observations.	Lamp Power of 5 cubic feet.	Corresponding Candle Pow'r.	Highest Observation.	Lowest Observation.	Highest more than Mean.	Lowest less than Mean.	Per cent. error + Greatest.	Per cent. error − Greatest.
				deg										
April 25..	Suggs, 14 C...	1	3	75	5·000	3·060	3·060	13·22	3·08	3·04	·020	·020	0·65	0·65
" ..	" 16 C...	1	3	75	5·040	3·034	3·009	13·00	3·08	3·00	·046	·034	1.52	1·12
" ..	" Referee	1	3	75	4·850	4·006	4·129	17·84	4·05	3·98	·044	·025	1·10	0·65
April 26..	" 14 C...	1	3	75	4·960	3·055	3·079	13·30	3·09	3·02	·035	·035	1·15	1·15
" ..	" 16 C...	1	3	75	4·970	3·032	3·050	13·18	3·08	3·00	·048	·032	1·58	1·05
" ..	" Referee	1	3	75	4·790	3·906	4·077	17·61	3·97	3·85	·064	.056	1.64	1·43
April 27..	" 14 C...	1	3	76	5·020	3·232	3·219	13·91	3·26	3·21	·028	·022	0·87	0·68
" ..	" 16 C...	1	3	76	5·030	3·174	3·155	13·63	3·20	3·14	·026	·034	0·82	1·08
" ..	" Referee	1	3	76	4·860	3·997	4·112	17·76	4·02	3·96	·025	·037	0·62	0·93
April 28..	" 14 C...	1	3	81	4·930	3·103	3·147	13·59	3·13	3·09	·027	·013	0·87	0·42
" ..	" 16 C...	1	3	81	4·970	3·103	3·121	13·48	3·12	3·08	·017	·023	0.55	0·74
" ..	" Referee	1	3	81	4·900	4·138	4·222	18·24	4·18	4·01	·042	·028	1·01	0.68
April 29..	" 14 C...	1	3	71	4·950	3·143	3.174	13·71	3·17	3·12	·027	·023	0·55	0·74
" ..	" 16 C...	1	3	71	4·970	3·117	3·135	13·54	3·14	3·10	·023	·017	0·74	0·54
" ..	" Referee	1	3	71	4·810	3·976	4·133	17·85	4·01	3·91	·034	·066	0·86	1·66
April 30..	" 14 C...	1	3	68	4·960	3·252	3·278	14·16	3·28	3·23	·028	·022	0·86	0·68
" ..	" 16 C...	1	3	68	5·000	3·236	3·236	13·98	3·26	3·21	·024	·026	0·74	0·80
" ..	" Referee	1	3	68	4·950	4·137	4·178	18·05	4·18	4·10	·043	·027	1·03	0·65
May 1....	" 14 C...	1	3	68	5·000	3·251	3·251	14·04	3·27	3·24	·019	·011	0·58	0·34
"	" 16 C...	1	3	68	4·960	3·224	3·250	13·94	3·25	3·20	·026	·024	0·81	0·74
"	" Referee	1	3	68	4·950	4·177	4·219	18·22	4·20	4·13	·023	·047	0·55	1·13
May 2....	" 14 C...	1	3	72	5·040	3·248	3·222	13·92	3·27	3·22	·022	·028	0·68	0·86
"	" 16 C...	1	3	72	4·970	3·203	3·222	13·92	3·23	3·19	·027	·013	0·84	0·40
"	" Referee	1	3	72	4·880	4·126	4·227	18.26	4.16	4.10	·034	·026	0·82	0·63

Mean error of extremes= ±0·90—0·82.

The column in table A under head of "lamp power of 5 cubic feet" is reduced to that amount by rule of three; "corresponding candle power" is the lamp power multiplied by 4·32. Columns highest and lowest observation gives extreme range of ten observations made at intervals of one minute, and include the error of the eye in setting sight-box, as well as any errors possibly caused by variations of standard or fluctuations in the gaslight incident to changeable pressure or other cause. To be certain that the error of eye in setting the sight-box should be included in the above the pointer was covered up entirely, and between every observation

the sight-box was moved a foot or so to right or left, and afterwards placed in position of equilibrium of light untrammelled by any previous adjustment. The last two columns contain the percentage error in each case of the two extreme observations of the set of ten—hence *the greatest possible error* in each case, *and about five times the probable error of one observation* of one minute. The error of the eye, and the fluctuations of both gas burner and standard, if any, are all combined in these columns, and, as it may naturally be supposed, they cannot in all cases neutralize each other, we may assume, as far as the experiments go with the apparatus in question, the combined error + or — is, for a single observation, equal to 1·64 per cent. Hence I take the liberty to conclude that the most erroneous single observation in a series of 240 is 1·64 per cent., and the probable error one-fifth that amount. The mean of extreme error in a series of 24 single observations is 0·9 per cent. The amount of light on the disc for a one-hundred-inch bar, is, I believe, though accidently so, about the best amount to secure the greatest accuracy of eye. The accuracy of eye, it will be observed, is subject somewhat to daily fluctuations, the greatest errors all falling in one day's observations.

A second table, B, will be readily understood. It exhibits the difference in the rating of the quality of the gas as obtained by the different burners (Sugg's 16 candle and Sugg's 14 candle argand), the mean difference of such rating, and also the variation from this mean of each burner. The greatest variation shown from the mean is less than one per cent.; the average difference less than one-half of one per cent. Another column shows the superiority of burner A over B, and the difference of each observation from the average superiority. It will be observed that this difference contains another element of uncertainty, namely, variations in light caused by differences in consumption reduced by rule of three. A further discussion on this point is reserved for some other tests.



"B."

OBSERVATIONS MADE WITH MOBILE STANDARD LAMP PHOTOMETER.

DATE. 1877.	Burner. Sugg's 14 C. A.	Burner. Sugg's 16 C. B.	Increase or Decrease. A.	Increase or Decrease. B.	Mean.	Difference from mean. A.	Difference from mean. B.	Superiority of A over B.	Difference from mean superiority of each observation.
April 25.	1322	1300	.....	.....	.....	.....	.....	·22	+·043
" 26.	1330	1318	+·08	+·18	+·13	−·05	+·05	·12	−·057
" 27.	1390	1363	+·60	+·45	+·525	+·08	−·08	·27	+·093
" 28.	1359	1348	−·31	−·15	−·230	+·08	−·08	·11	−·067
" 29.	1371	1354	+·12	+·06	+·090	+·03	−·03	·17	−·007
" 30.	1416	1398	+·45	+·44	+·445	+·005	−·005	·18	+·003
May 1.	1404	1394	−·12	−·06	−·090	+·030	−·030	·10	−·077
" 2.	1392	1392	−·12	−·02	−·070	+·035	−·035	.....	−·177
" 3.	1436	1408	+·44	+·16	+·300	+·140	−·140	·28	+·103
" 4.	1628	1607	+1·92	+1·99	+1·955	+·030	−·030	·21	+·033
" 5.	1483	1482	−1·45	−1·25	−1·350	+·100	−·100	·01	−·167
" 6.	1507	1497	+·24	+·15	+·195	+·045	−·045	·10	−·077
" 7.	1499	1480	−·08	−·17	−·125	−·045	+·045	·19	+·013
" 8.	1483	1459	−·16	−·21	−·185	−·025	+·025	·24	+·063
" 9.	1488	1470	+·05	+·11	+·080	−·030	+·030	·18	+·003
" 10.	1512	1505	+·24	+·35	+·295	−·055	+·055	·07	−·107
" 11.	1502	1469	−·10	−·36	−·230	−·130	+·130	·33	+·153
" 12.	1505	1479	+·03	+·10	+·065	+·035	−·035	·26	+·083
" 13.	1503	1489	−·02	+·10	+·040	−·060	+·060	·14	−·037

Mean superiority, A over B..... ·177

I have maintained since 1867 that small differences in consumption should be corrected to the standard, according to the square of the amount of gas consumed instead of rule of three. Mr. Farmer, of New York, desired two years subsequently to push this rule to all variations of consumption, and in that shape it received the title of "Farmer's theorem." Leaving to Mr. Farmer the task of demonstrating the "theorem," I shall confine my efforts to showing how nearly true was my original proposition—namely, that for small variations in consumption it is truer to reduce to 5 cubic feet, according to the square of gas consumed, rather than the simple ratio.

In order to show with this apparatus what regularity of results may be obtained with few observations, extending over a small period of time, I insert Table C, containing a test of some new burners, or rather some old burners under new names.

The burners in question are called the Parsons Patent and the Bartlett Patent Boulevard burner, the latter apparently identical with H. Girond's burner, brought out in France a number of years since.

The Parsons burner is slightly different. Each result contains four observations of illuminating power—two with flat of flame and two with the edge turned toward sight box. The consumption was rated by four one-minute observations of the meter. In the case of the Parsons the consumption varied somewhat. In case of Bartlett's it was very regular.

C.

PARSONS' GOVERNOR BURNER, NO. 1.

Rated against Mobile Lamp Standard.

Rate of gas consumption.	Lamp power.	Corresponding Candle power.	Candle power each cubic foot gas.	Pressure.
4·33	2·57	11·002	2·54	21 10ths
4·30	2·59	11·190	2·602	13½ 10ths
NO. 2 BURNER.				
2·375	1·24	5·357	2·255	13½ 10ths
2·325	1·195	5·162	2·220	21 10ths
BARTLETT'S BOULEVARD BURNER.				
5 ft. Drum, 6 ft. Lava Tip.				
4·925	3·232	13·962	2·835	21 10ths
5·200	3·570	15·420	2·965	14 10ths
5·000	3·333	14·398	2·880	95 100ths
4 ft. Drum, 5 ft. Tip.				
4·45	2·892	12·490	2·807	95 100ths
4·325	2·765	11·945	2·762	14 10ths
4·039	2·541	10·977	2·718	21 10ths

The above observations took four minutes each, exclusive of starting and changing burners and pressures. The rate of the Parsons burner fluctuated most during the observations, but averaged less fluctuations on the four. It could not be burned at 1 inch pressure. The drum is smaller than the Girond—beg pardon, Bartlett—burner, and governs in a different manner, the cone being below instead of above the drum.

By the above tests, it can, I think, be proved that the Mobile lamp standard is greatly superior in accuracy to the candle method, and very much more economical in point of time.

Lastly, some curiosity may be had to know how close together the observations of different observers will come.

As between Mr. O'Brien, who makes the regular observations at Mobile, and myself, there is a very minute difference, not over one-quarter of one per cent. as a mean of a number of observations, each alternately setting the box for a series of ten observations. I had not anticipated one-fourth this accuracy, nor do I feel justified yet in claiming any such as an average. The following observation by lamp and candle method I find recorded, date February 28:

5 cubic feet gas by 5 observations by O'Brien = 3·406 lamps.
Cover No. 1, Chimney No. 1, 5 cubic feet gas by 5 observations by Edgerton = 3·410 lamps.

Same gas by Bunsen candle photometer:

5 cubic feet according to 15 observations by O'Brien = 12·54 candles.
5 cubic feet according to 15 observations by Edgerton = 12·16 candles.

On another occasion I tested at New Orleans the accuracy of a small portable affair—the distance from lamp to burner 64·25 in.

NEW ORLEANS, March 16, 1877.

Sugg's 16 C burner against lamp standard:

	From Lamp.		From Lamp.
Sight-box set by Theo. Forstall	22·9	Lamp power mean of all	3·182
" " " " Francis Carroll	23·0	" " Mr. Forstall, 1st observ'n.	3·260
" " " " W. Clark	23·3	" " Mr. Carroll's 1st "	3·216
" " " " H. H. Edgerton	23·1	" " Mr. Carroll's 2d "	3·173
" " " " F. Carroll, 2d time	23·1	" " Mr. Edgerton's "	3·173
Mean	23·08	" " Mr. Clark's "	3·089

Taking into consideration the fact that the above results were obtained by a *single observation* with a comparatively crude portable apparatus, the accuracy seems quite extraordinary. None of the foregoing observations are selected. They do not represent all the observations made, but they are consecutive. It is my intention to publish an investigation of various gas burners; the data not being at hand, the publication will be deferred.

I may add that I fully believe other improvements will be necessary in photometric apparatus, as at present in use to enable the full measure of accuracy to be obtained from the Mobile standard light.

I will specify the following:

A more accurate measurement of the gas for short observations.

A more equable pressure for Argand burners.

In reference to the lamp standard the following changes would probably improve it, as well as facilitate its use.

An adjustable hole in the chimney so that the light of the standard can be conveniently adjusted to 3, 4 or 5 candle power. An appliance to raise and lower the wick entirely independent of the chimney or the chimney cover; the opening to be rectangular instead of round; the glass chimneys to be made with same contraction and of more perfect glass. I had

some trouble in securing even measurably clear chimneys, and even with care I could not find two chimneys to give an equal light through the same sized opening.

It may be that an Argand gas-burner could be covered and used as a standard, but not as well as a lamp, for several reasons. It will be remembered that Mr. D. Bruce Peebles, a Scotch gas engineer, present at the autumn meeting of 1875, in some remarks made to the Association (after my photometer was described) stated that he had heard of something of the kind in England, only that a gas burner was used instead of a lamp. I asked Mr. Peebles afterward where he had heard of it. He informed me that the manager at Bristol was the inventor, but he did not remember his name.

This is another illustration of the fact that nothing can be brought out in this country that our English cousins have not in some manner anticipated.

At any rate, it had not at that time appeared prominently in gas literature to my knowledge. Mr. Goodwin has made some improvements in the candle photometer, whereby the time of starting and stopping an observation can be gauged with the minutest accuracy. I hope he will turn his mechanical and executive ability to the furnishing us with a gas measure and pressure regulator that will be equally accurate, in order that the Mobile standard may be subjected to a test with conditions more favorable than above detailed.

Any one desiring to test the accuracy or convenience of the Mobile lamp standard, or to use it, should communicate with me by letter, for two reasons; first, that I may furnish him with drawing or photograph (without cost), and second, because I have determined to patent the lamp standard as described here, to insure to myself the credit of its invention. I have learned by experience the necessity of so doing.

THE LOWE PROCESS AT BALTIMORE.

The Consumers' Mutual Gaslight Co.

The starting of this system in Baltimore has, at this time, a peculiar significance, which renders it worthy of some mention. The works, which have heretofore enjoyed a monopoly of the business of that city, were largely owned in this city by that circular organization which represents the control of the older companies, not only here and in the neighboring cities, but in the principal distant ones also. Two years ago the new process was in courtesy offered to them, as the parties in local possession. But the offer was rejected with that fine touch of scorn which the old vested interest understands how to employ. It was not expected, of course, that gentlemen so largely interested in gas-coal mines would depreciate those stocks by adopting an anthracite process. But the opportunity was nevertheless offered and declined. A charter was then obtained for a new company, which the old ones insisted was unconstitutional (a favorite argument with monopolists), but which was sustained by the courts.

Presently some prominent citizens took an interest therein, and, after making due investigation and inquiry, decided to go forward with the enterprise, adopting the Lowe method as the one best calculated to give competition because of its production of superior gas at an important saving in cost. The active work was begun about a year ago, an admirable site having been selected at Canton, accessible to water and rail. Much inconvenience to both manufacturer and customer being traceable to the piecemeal way in which pipes have been laid by old companies, resulting in insufficient or unequal pressures, it was determined to build liberally. Under the able direction of Mr. F. H. Hambleton as Engineer, a system of distribution was designed not only with reference to the varying levels of the city and its present area, but also its future growth, and the result is that the new company has the largest and finest mains in the United States. Starting out with a mile and a half of 30 in. pipe, three miles of 24 inch follow, with a diverging net-work of 20, 18 and 16 inches. These have been so admirably put down as to make ample provision for almost any demand the laterals may be put upon them. The works are contained in a substantial building of brick, with granite trimmings, and under one roof, which is an iron truss, slate covered. It measures 285×69 feet and embraces, besides the generating, condensing and purifying apartments (which are all of brick and iron), pleasant offices, photometer room, bathroom, etc. There are at present eight sets of Lowe apparatus, complete in all parts, with separate washers, scrubbers and condensers, and having a capacity of about 1,000,000 feet per 24 hours; and foundations are laid for an equal additional number. The lime house contains four boxes each 16 by 22, of the most approved style. The holder is a telescopic one, 108 feet in diameter and of 60 feet rise, with wrought iron cylindrical columns, a very creditable monument to the mechanical ability of Mr. Bartlett, the President. It is the first work of the kind ever built at his shops. Let us hope that it will not be the last, as the company stands ready to duplicate it if the demand should require. Its capacity is 540,000 c. ft. A fine artesian well on the premises affords a full supply of pure water, which is pumped to four great iron tanks beneath the roofs. The petroleum reservoirs are upon separate premises (to be earth-covered), the oil being pumped to the small distributing tank back of each generator.

During the building of these works and the laying of the 54 miles of mains (the first installment of pipe), the company had made a canvass among the citizens, proposing to lay services and set meters free of charge and sell gas of 18-candle power (the Maryland statute requires but 12 candles) at $2 per thousand, in lieu of $3 charged by the old company. In consequence, a large proportion of the consumers have pledged themselves to take the new gas for periods from two to five years, and some 5,000 connections have already been made. The enterprise had, therefore, assumed the form of a great popular movement. Under these circumstances, the work was substantially completed early in November, the contractor retaining possession pending a settlement with the company. The directors say that a basis for this was arrived at with little delay, but for some reason beyond their control and not yet explained, no settlement was reached, and the delivery of the works was delayed.

It began to be rumored in Baltimore, and in gas circles here, that the Lowe process would not start there, and that something was wrong; and finally it began to be suspected (whether justly or not we do not know) that the old company, whose stock had already declined from 280 to 130, was conniving with the contractor for the control of the shares. This plot, which, in view of the antagonisms excited by the Lowe process, is a very probable one, was (happily for progress) thwarted by the vigorous action of the directors of the new company, who recently took forcible possession of the works, and, holding them under guard night and day, announced the facts in a public circular, and promised a prompt supply of gas according to agreement. Last week this promise was fulfilled by the starting of the works, which went into operation in a manner fully justifying all that has been claimed for the process, and proving the thorough construction of the plant. When gas was let into the mains but one leak was discovered. The inadequacy of the lime boxes of the works in some other places to sustain the maximum rush of the gas, would appear to be remedied here, for careful tests show the gas to be of remarkable purity, while its illuminating power is very high.

Heretofore the old dynasty has been able to drive any rivals into some form of compromise, but we believe that the Lowe process for the first time gives the people a chance for genuine competition in gas lighting, and we congratulate the residents of Baltimore on their prospects, and wish the Consumers' Company large success.

REVIEW OF THE CALIFORNIA MINING INDUSTRY FOR 1877.

We take the following interesting review of the mines of California for 1877, from the San Francisco *Commercial Herald* of January 17 :

"Notwithstanding a greatly restricted water supply, the leading mining industries of this coast have prospered well during the past year, as the aggregate production of bullion denotes. For thirty years and more we have had but one winter that showed a less rainfall than that of 1876-77; and when it is considered how largely the success of several important branches of mining is dependent upon a full water supply, it is matter for surprise that the crop of bullion should have been as large as it really was. With an annual rainfall of less than ten inches, as during the past winter, the operations of our hydraulic mines suffer serious curtailment, the yield of the vein mines in many localities being also greatly lessened. In all parts of the country many of the ore-crushing mills are driven wholly or partially by water, and when this is in short supply their productive capacities are diminished in like ratio.

"The most reliable data at this moment available shows the value of the bullion made the past year throughout the countries lying west of the Rocky Mountains, and along or near the easterly slope of the great Cordillera, to have been about $100,000,000, being an increase of $7,000,000 on the product of 1876. The foregoing are our own estimates, based on information derived through various trustworthy channels; the figures compiled by John J. Valentine, general superiniendent of Wells, Fargo & Co.'s Express, makes the product for these two years somewhat less.

"The annual product of bullion on this coast has been gradually increasing for the past six years, as the table appended will show, the yield for 1877 being already given:

	1873.	1874.	1875.	1876.
California	$18,025,722	$20,300,531	$17,753,151	$19,000,000
Nevada	35,254,507	35,452,233	40,478,369	49,300,000
Oregon	1,376,389	609,070	1,165,046	1,200,000
Washington	209,395	155,535	81,932	100,000
Idaho	2,343,654	1,880,004	1,554,902	1,700,000
Montana	3,892,810	3,439,498	3,573,609	2,800,000
Utah	4,906,337	5,911,278	5,687,494	5,600,000
Arizona	47,778	26,066	109,093	1,400,000
Colorado	4,083,268	4,191,405	6,299,817	7,000,000
Mexico	868,798	798,878	2,408,671	2,200,000
British Columbia	1,250,035	1,636,557	1,776,953	1,500,000
Totals	$72,258,693	$74,401,055	$80,889,037	$91,800,000

"To the product of 1876 there should be added the sum of $1,200,000 to represent the yield of Wyoming, Dakota and New Mexico, making for that year a total of $93,000,000. By consulting the above table it will be seen that a forward movement in bullion production has been going on steadily during these six years, the total advance amounting to $36,000,000, being an average of $6,000,000 per year.

"Since the discovery of gold in California, which event occurred thirty years ago the present month, there have been created in the countries lying west of the Missouri River, and mostly on American territory, bullion values to the amount of $1,948,000,000. Of this sum about $1,586,000,000 has been composed of gold, very little silver having been produced here prior to 1861, when the Comstock deposits, discovered three years before, began first to turn out this metal in notable quantity. At this time, when the status which gold and silver are to occupy in the currencies of the world is being so much discussed, it may be worth while to ascertain as nearly as may be the rate at which these metals have been and are hereafter likely to be produced, as their relative increase must have much to do with the determination of this problem. From the discovery of gold in California in 1848, till the date of active bullion production on the Comstock lode in 1861, there was turned out in our Pacific States and Territories, including some small lots received from British Columbia and Northwestern Mexico, gold to the value of $700,000,000, the silver product of these regions having meantime amounted to very little. Since, and including the year 1861, the production of gold for the entire coast has been $876,000,000; silver, $372,000,000. The disproportion here shown between the yield of the two metals has been every year diminishing, until it has now become almost equalized, the bullion made last year having consisted of about $51,000,000 gold and $49,000,000 silver, a ratio of production that will be likely to hold without much variation in the future.

"While it is true that more silver than gold bearing mines are being discovered and developed into productive properties, it is still the case that the percentage of gold contained in many of the lodes opened up so increases with depth that this becomes at last the predominent metal. Such has been the history of all the ore bodies on the Comstock that have held to great depths. Of the $36,000,000 turned out by that lode in 1877 forty-three per cent. has been gold. Of the base bullion made in Eureka district last year—valued at $12,000,000—over sixteen per cent. was gold, this being about the rate at which this metal occurs in the bullion sent from the other mines in the State of Nevada, excepting those on the Comstock range. Taken as a whole, the bullion from that State carries not far from forty per cent. of gold. Idaho and Montana, which in the past have been mainly gold producing, have latterly begun to turn out a considerable percentage of silver, and it will not be long till the bullion from these territories will contain thirty or forty per cent. of this metal—a condition of

things that will be nearly reversed in Wyoming, Colorado, New Mexico, and Arizona. Utah bullion will be apt to consist, as heretofore, almost wholly of silver, while that made in California, Oregon, Washington Territory, British Columbia and Dakota will contain from eighty to ninety per cent. of gold. The opening up of a series of what promise to be very prolific gold bearing veins in Mono County, California, may be expected to offset the prospective flow of bullion from the argentiferous deposits of Alpine, Inyo, and other districts in that quarter of the State.

"In California the business of mining for the precious metals has been attended during the year just closed with very uneven results. As a general thing, the working of auriferous quartz has been actively pursued, and proved fairly remunerative. While no entirely effective method for desulphurizing or chlorodizing the refractory ores has been introduced, there has still been some progress made in overcoming both this and other of the more distinctive troubles that beset the business. Between the gains made in the chemistry of the business, however, and through the employment of improved machinery for concentrating the sulphurets and various other mechanical contrivances, this class of ores is every year being worked with greater closeness.

"*In Amador County*, where this industry has reached its greatest expansion, quartz mining has been pursued with considerable vigor, and a large extraction of gold would have rewarded the enterprise displayed, had not many of the mills been brought to a standstill early in the season from want of water, here extensively used for motive power. Several new hoisting works have been put up in the county during the year, also a number of mills, about one hundred stamps having been added to the number previously running. Some of the companies have supplied themselves with sulphuret reduction works, a class of establishments here greatly needed, much of the ore carrying a large percentage of rich sulphurets, which, when concentrated, yield from one to two hundred dollars per ton. In Amador are to be found the deepest mines in California, some of the claims here having been explored to a vertical depth of 1,600 feet. Here, too, have been constructed some of the largest mills in the State, the Phœnix carrying eighty and the Oneida sixty stamps, there being a number of mills that carry as many as forty stamps each. The most active mining localities in the county are Drytown, Sutter Creek, Jackson, Amador City, Plymouth, Volcano and Fiddletown, the latter two the sites of the most extensive hydraulic washings in the county. The principal mines, so far as present production, development and outfit go, are the Phœnix, worked to a depth of a thousand feet, employing one hundred and twenty-five men, and crushing one hundred and forty tons of rock per day; the Consolidated Amador, a regular dividend-paying institution, with a forty-stamp mill, and opened to a depth of 1,600 feet; the Oneida, also a largely-productive and well-outfitted mine; the original Amador, a prosperous and well-managed property; the Kennedy, Lincoln, Crown Point, Gover, Mahoney, Keystone, the Enterprise, Bunker Hill and the Talisman, the latter turning out a very high grade ore. These mines are all furnished with powerful hoisting works, the most of them driven by steam, have been equipped with mills generally of large capacity, and have had the benefit of extensive and systematic development. A much longer list than the above might be given of promising mines here, some of them inferior to those mentioned only in the matter of less thorough development and the lack of mills for reducing their own ores. Under this head may justly be classed the Live Oak, Olive, Montirichard, Bismarck, Pioneer, Good Hope, Griesback, Centennial, Beck, Golden Gate and the Potosi, the latter a famous old mine, that after a long period of neglect has lately been put in good shape for renewed operations.

"While there is a considerable extent of fair paying gravel in this county the hydraulic, like the quartz mines here, were greatly crippled in their operations last year by the prevailing water famine, few companies having been able to continue washing for more than three or four months in the early part of the season. As measures have been taken for introducing a more plentiful supply of water into the principal mining districts of the county, this interest will not be likely to suffer so severely from a want of this element in the future.

(TO BE CONTINUED).

ON THE VARIATION OF THE MAGNETIC NEEDLE.

TO THE EDITOR—*Sir:* In the issue of the ENGINEERING AND MINING JOURNAL of Jan. 26, a number of questions were asked in regard to the Variation of the Needle. In reply thereto permit me to say that the locality mentioned (39° latitude and 81° 30′ longitude) is a short distance south of Parkersburg, W. Va, and *west* of the line of *no variation*.

This line in 1870 passed through Cleveland, O., a short distance west of Wheeling and through Raleigh, N. C. At all points on it the needle points due north and south, and coincides with the true meridian. East of this line the needle points to the *west* of the true meridian and towards the line mentioned, and its variation is said to be *west*. West of the line the position of the needle is changed and points to the east of the true meridian and its variation is said to be east.

The line of no variation is slowly moving westward, the north end of the needle moving with it, and at all points to the westward of it the variation is *decreasing*, and to the eastward of it *increasing*.

The annual rate of increase and decrease, called the annual motion or variation, is variable, ranging from 4 to 5 minutes in the Eastern States, to 3 to 4 in the Middle, and 1 to 2 in the Southern States. It is not constant, but varies both in intensity and localities.

At	Marietta, O.,	from	1810	to	1838	it was	2·4	minutes	per year
"	Cincinnati,	"	1825	"	1840	" "	2	" "	"
"	Philadelphia,	"	1813	"	1837	" "	3·6	" "	"
"	"	"	1860	"	1870	" "	4·3	" "	"
"	Parkersburg	"	1860	"	1870	" "	3·2	" "	"

We do not think the annual motion at the latter place was as great either before or after the period named, but we will adopt it for the purpose of illustration.

We will place the questions in the order they are asked and answer them successively:

FIRST SERIES OF QUESTIONS.

1. Which side of the true meridian will the N. end of the needle rest on?

Answer.—On the *East* side, the variation being *East*.

2. What angle will it make with the true meridian?

Answer.—At this time (1878) about 24 minutes.

Explanation.—In 1870 the variation was 0° 50′ *East*—*i. e.*, when the compass pointed true north, the needle rested 50 minutes *East* of true north, and in the 8 years, from '70 to '78, the change in variation was 26 minutes or the needle moved that much W. and *decreased* the var. to 24′.

3. What will the variation be called?

Answer.—*East*—the needle pointing to the *East* of the true meridian.

SECOND SERIES OF QUESTIONS.

In 1848 a line was run bearing N. 10° 00 E.

1. What will be its magnetic bearing in 1878?

Answer.—About N. 11° 36 E.

Explanation.—From 1848 to 1878 = 30 years @ 3.2 per year = 1° 36. Bearing 1848—N. 10° 00 E. + var. since then 1° 36 = N. 11° 36 E., or present course. In a reading of N. 10° E., the needle points 10° *W.* of N., and as it moves W. in sympathy with the movement of line of no var. the N. E. and S. W. courses are *increased* and the N. W. and S. E. *diminished*.

2. What will be the bearings both years by *true* meridian?

Answer.—The bearing by true meridian will always be the same, and in this instance is N. 12° 00 E. for both years.

Explanation.—Magnetic bearing 1878 = N. 11° 36 E. + var. 24′ = N. 12° 00 E.
do. do. 1848 = N. 10° 00 E. + 1° 36 + 24′ = N. 12° 00 E.

THIRD SERIES OF QUESTIONS.

In 1800 bearing of line was N. 2° 00 E.

1st. What will it bear in 1878?

Answer.—Doubtful, on account of the meagre data relating to the variation of that early day, but we think it will bear about *N.* 5° 27 *E.* As nearly as we can ascertain the var. at Parkersburg since 1800 is 3° 27. We have no record at Parkersburg previous to 1860, but derive our deductions from the var. at Baltimore, in about the same latitude and with about the same annual change, and also from the U. S. Coast Survey Chart of Magnetic Variations, 1870.

2d. What will the bearing be in 1908?

Answer.—Impossible to foretell; depends upon the annual change of var. and its direction. If it continues at the rate and in the direction we have been using (3·2 per year) it will be N. 7° 03 E.

3d. What will be the true bearing?

Answer.—The same in all years, N. 5° 51 E.

The present variation from the true meridian can be very easily and satisfactorily obtained by observations of the North Star, the process being fully explained in Gillespie's Surveying, or in any standard work on surveying.

The variation since 1800, and the mean animal motion since that time can be ascertained by retracing lines of that date, in the neighborhood where the variation is desired.

The amount of variation depends to some extent on the instrument used, few reading alike. In a test of eight instruments made by various parties, in 1875, the readings were 4° 40′, 4° 50′, 4° 55′, 4° 59′, 5° 01′, 5° 05′, 5° 09′ and 5° 11′ West, showing an extreme difference in the readings of 31′. The first and last instruments were by the same maker.

The daily variation, amounting at times to 15′, has its influence in determining variations, and the time of day should be noted in making observations for the purpose.

A full discussion of the subject of variations of magnetic needle in all its details, will consume more space than the limits of the article will permit. We shall be pleased to have the experience of surveyors on the subject.

January 31, 1878. G. B. S.

[We are much obliged to our correspondent, "G. B. S.," for the above answers. They are so clearly expressed that they do not require any cuts to illustrate them.—ED. E. AND M. J.]

NEW PATENTS.

The following is a list of new inventions relating to Iron, Coal, Mining Machinery, Chemical Apparatus and the treating of Precious Metals,, etc., from the official *U. S. Patent Gazette*, for the first three weeks in January:

No. of Patent.	*Title of Invention.*	*Name of Inventor.*	*Residence.*
198,733	Manufacture of Iron and Steel	Isaac L. Bell	Rounton Range, Eng.
198,737	Heating and Feeding Water for Steam Boilers	Samuel L. Fulton	Pittsburgh, Pa.
198,767	Apparatus for Roasting Ores	Henry F. Howell	Sarnia, Ont.
198,776	Recovery of Waste Nitrous Gases	Bernard C. Molloy	London, Eng.
198,779	Balanced Valves for Steam Engines	Frederick B. Rice	Dunkirk, N. Y.
198,804	Apparatus for Hardening and Tempering Sheet Steel	Albert Luttges	Solingen, Ger.
198,831	Machine for the Manufacture of Ice	Albert Albertson	Jersey City, N. J.
198,849	Stone Breakers	Samuel L. Marsden	New Haven, Conn.
198,862	Gas Regulators	Geo. W. Thompson	Brooklyn, N. Y.
198,883	Injection-Condensers	William H. Guild	Brooklyn, N. Y.
198,891	Injectors	John D. Lynde	Philadelphia, Pa.
198,904	Amalgamators	Ira M. Phelps	Philadelphia, Pa.
198,916	Oscillating Valves for Steam Engines	R. H. D. Morrison	Winona, Minn.
198,936	Ore Crushers	Edward Gimson	Staleybridge, Eng.
198,945	Furnaces for Smelting Lead	John B. McCurdy	Joplin, Mo.
198,978	Governors for Steam Engines	Paul Grimm	Glen Cove, N. Y.
199,000	Furnace Feeders	Michael H. Smith	Halifax, Eng.
199,061	Rotary Engines	George C. Hale	Kansas City, Mo.
199,069	Furnaces for Burning Pyrites	John Hughes	Stapleton, N. Y.
199,074	Pump Plungers	John Knouse	Harrisburg, Pa.
199,091	Ventilators for Mines, Cellars and B'ld'gs.	John C. Morgan	Philadelphia, Pa.
199,095	Amalgamators	George O'Brien	London, Eng.
199,123	Turbine Water Wheels	Jesse G. Thompson	Clarion, Pa.
199,131	Pumps	Josiah A. Whitman	Providence, R. I.
199,134	Tuyeres	Thos. F. Witherbee	Port Henry, N. Y.
199,140	Governors	H. F. Farnsworth	Bellefonte, Pa.
199,157	Pressure Gauges for Steam Boilers	John Helivig	Frank't-A-M, Ger.
199,164	Furnaces for Heating Iron and Steel Bars	Chas. E. Morgan	Worcester, Mass.
199,177	Lifting Jacks	S. Barrow, etc	Windfall, Ind.
199,179	Collapsible Cores for Casting	Geo. Bissett, Jr.	Quebec, Can.
199,180	Appar's for Join'g the Ends of Lead Pipes.	A. L. Bricknell	London, Eng.
199,182	Furnace Doors	Thos. R. Butman	Milan, Ohio.
199,191	Nut Locks	Frank B. Davis	Johnstown, Pa.
199,237	Steam and Hydraulic Presses	John F. Taylor	Charleston, S. C.
199,246	Apparatus for Carbureting Air	Chas. E. Wolle, etc.	Philadelphia, Pa.
199,267	Appar's for Col'g Dust from Ore Sep.,&c.	John P. Conkling	Sar't'ga Sp's, N.Y.
199,274	Flumes for Water Wheels	Jas. P. Drouillard	Greenville, Mich.
199,288	Double Acting Steam Pumps	Albert F. Hall	Boston, Mass.
199,312	Pipe Couplings	Chas. H. Perkins	Bloomington, Ill.
199,319	Clinometers	Lewis C. Schnell	Akron, Ohio
199,345	Windmills	Geo. Hodges	Racine, Wis.

Reissues.

8,021	Dumping Cars	Daniel O'Brien	Brooklyn, N. Y.
8,029	Ret's for Sep'g Zinc from G'ld & Sil. All'ys.	Edward Balbach	Newark, N. J.
8,032	Wire Twisting Machines	Carl Shortan	New York, N. Y.
8,033	Tuyeres	Thos. F. Witherbee	Port Henry, N. Y.
8,036	Valves for Steam Engines	Otis Adams	San Francisco, Cal.
8,037	Ore Wash'g Apparatus for Hyd'c Min'g.	J. M. Allenwood	Timbuctoo, Cal.

DIRECT-ACTING GAS FURNACES FOR PUDDLING.

In 1864 Dr. Percy wrote: "The utilization of the waste heat of puddling furnaces has, as far as I am aware, related almost exclusively to the raising of steam." Since then a number of regenerative gas-puddling furnaces have been set to work in England and Scotland. Under this heading we include not merely the Siemens furnace, but also the Gorman and the Ponsard direct regenerative furnaces, the Price "retort" furnace, and the Casson-Dormoy. With what success these furnaces have worked we shall not now consider.

The Eckman furnace, which Dr. Percy attempted to introduce in 1848, was, in its way, complete as a gas furnace, and should have given as fair results, after some modifications of detail, with Staffordshire coal as with the wood and peat of the iron districts of Sweden. As the greatest waste of fuel occurs in the manufacture of iron, it was natural that the first engineers who worked at gas furnaces should be iron makers. This was the case with Bischof in 1843, at the puddling furnaces at Eisenspalterei, near Berlin; and the French engineer Ebelmen at Audincourt and Clerval. At Pravali, in Carinthia, iron works well-known on the Continent, we saw in 1874 gas furnaces on the same plan as some working in 1841, or 36 years ago. The gases evolved from step grates and with a natural draught were conducted over the fire-bridge and there burnt by a blast of air, with a saving, it was said, of from one-quarter to one-third of the fuel—lignite of the neighboring deposits—originally used. At Nothburga, Kessen, Ebenau, all districts in Austria, iron of the very first quality has been turned out of direct-acting puddling furnaces, fired with lignite or peat, for a couple of generations. In England, furnaces somewhat similar in principle, such as the Casson-Dormoy and Price's, are being slowly introduced, having to encounter the usual prejudices.

There is no doubt that, as Mr. Frederick Yates has pointed out, the consumption of fuel can in many cases be reduced by 40 per cent. by the use of direct gas firing. The fuel is saved in several directions. The first saving is that due to the mere use of any gas furnace; the second to the higher temperature to which the furnace can be raised and worked; the third is the facility it gives for working heavier charges; fourthly, all kinds of slack can be burnt in the producer; and lastly, the pigs can be easily preheated in a dandy, and steam raised by the waste gases, neither of which latter processes can be carried out by a Siemens furnace. There is, further, a considerable diminution in the usual loss or oxidation of the iron, and, from this and other causes, the quality of the iron produced from a given kind of pig is very much improved.

The saving of coal due to the mere use of gaseous fuel can be estimated, as in most well-constructed gas furnaces, at from 25 to 30 per cent. and more. The saving obtained by raising the working temperature is more difficult to measure. The temperature at which puddling furnaces work must be very close upon 2000° Fah., more or less, as that is about the heat at which pig iron melts, and the melting or boiling of the iron is the first operation. According to Poncelet, gray pig of the second casting melts at 2150° Fah., white pig at 1925°. Previous observers, using Daniell's old pyrometer, have given 2786° Fah., but these figures are now generally admitted to be too high. In round figures, the very highest temperature may be taken at a little above 2000° Fah.; it is probably rather less in furnaces working badly. Now it cannot be too often repeated that the heat available in any furnace is clearly only the actual difference in temperature between the atmosphere of the furnace itself and the temperature of the objects it is wished to heat. Hence merely an increase in its working temperature in itself at once induces a considerable economy, and in the direct ratio of the increase of heat over and above the original temperature and the temperature the work to be done can bear. If the heat of the fire be only a few degrees less than that it is wished to impart, or if it be merely equal to it, there can be no transference of heat at all. But the action gets to be more rapid, and hence all the more economical, the greater the differences in temperature.

We now return to other advantages special to direct-acting gas puddling. If a mass of material, say pig iron, has to be heated to 2000° Fah., the flame must have a temperature much in excess, say 2500° Fah.; the gases, after doing their work, escape at a temperature but little less. But by using these gases to heat the air to be used for combustion in the next unit of time, much of the heat that would otherwise be wasted is picked up and applied to carrying on the succeeding combustion. Even if 1500° were abstracted there would still remain sufficient heat for pre-heating the pig iron to a red heat in the dandy or pre-heater behind the main bed. All the attempts, more or less successful, at economizing the fuel in the ordinary puddling furnace have principally consisted in utilizing the waste gases in pre-heating the pig iron previous to melting it on the bed, and in conducting them through the flues of a steam boiler to generate steam for the hammers and mills. The temperature of the fire gases in an ordinary boiler furnace is given from direct experiments at about 1500° Fah., at one end of the flue, falling down to about 650° at the other. Now, as in the regenerative furnace the temperature of the gases is lowered in the regenerators down to 300° and 212°, they cannot be used to get up steam.

An obvious method of saving coal consists in increasing the charge in the furnace, as is done more especially by Messrs. Whitham & Sons, Leeds, and by the Sheepbridge Coal and Iron Company, Sheepbridge, Derbyshire; but, according to the report of the Puddling Committee of the Iron and Steel Institute, the percentage of "loss" is considerable, sometimes more than 12 per cent. This diminution in the yield, no doubt, in a great measure takes place while the heats of 15 cwt. and more are being balled, and as the ordinary grate is used, there is probably not sufficient command over the smoky, neutral, or reducing flame. Under such circumstances there can be but little money gain by saving fuel in this way. As 1 cwt. of good iron is of about the same commercial value as 1 ton of coal, a saving of 5 per cent. in the yield of iron in a 10-cwt. charge is equivalent to a saving of half a ton of coal. And one of the great advantages of a gas furnace, especially when blast is used with suitable coal, is to be found in the almost instantaneous facility with which the flame can be changed from an oxidizing to a reducing character and *vice versa*. Further, as the furnace works better, it is possible to employ a more neutral flame during the balling. The puddler has complete control over the combustion, and can command the gases in such wise as to obtain an oxidizing or a neutral flame, as desired. The iron is in this way also greatly improved in quality. Another reason for the diminution in the loss or increase of yield is that there are no holes for the inlet of cold air. It is well known that the diminution of loss, due to the oxidation of the iron itself, has always for a natural consequence an attendant improvement in the quality of the product.

Merely from the fact that the yields are so much better, the puddlers soon get to like a gas furnace, as they earn so much more wages. And this leads to the extension of double furnaces, as the labor of firing is practically nil, with the attendant economies resulting from increased charges, while as compared with the room taken up by two single furnaces there is a considerable saving in space.

There is yet another qualification peculiar to the gas furnace which is found to act most favorably on the quality. When, in the ordinary grate furnace, iron of a superior quality is to be made, the grate is fixed as low as possible in order to keep ash and cinders from passing over on to the bed or hearth. Now as the gas producer is quite separate from the combustion chamber, there are no dust and fine cinders to be carried over from the grate to become mixed with and injuriously act on the iron.—*The Engineer.*

MINING NEWS.

ARIZONA.

The Silver King mine has reached its third dividend and is contemplating the advisability of doubling the amount of the next one, making it $100,000 instead of $50,000. No stoping has yet been done, and in all the developments so far made hardly a barren spot has been found. The yield during the current year from all appearance will exceed the total yield of Arizona for 1877.

The S. F. Company, organized recently on Castle Dower lead mines, are getting at work, and will shortly be able to make a showing. Representatives of the English Company who have become interested in the Carga Muchaco mines have also arrived on the ground, and are getting matters into shape.

Very rich ore has been struck in the Hannibal mine, an extension of the Stonewall Jackson.

The developments on the McMillan ledge continue to produce most remarkable results in the way of ore of fabulous richness. Sheets and plates of virgin silver are found in the vein, and other ore of very high grade is found in abundance.

The new McCracken mill is completed and running, and times are good at Signal City. The McCracken Company are expending considerable money in opening their mine, and in erecting commodious and convenient surface buildings of all kinds. Outside of the "big mine" there are a number of excellent prospects

MONTANA.

The Mammoth gold vein is yielding gold in great abundance.

Correspondence of the *Miner* and the *North-West* furnishes the following items regarding Phillipsburg. We cull the following paragraph regarding the noted Gonyon silver copper claim at Butte:

"On the Gonyon claim on the Original lode the main shaft is down to water level, water having been struck at the depth of 57 feet from the surface. The shaft is an incline following the lode, which dips very slightly to the south, the dip forming an angle of not more than 5° with the perpendicular. From the bottom of the shaft levels are opened both ways, east and west, the face of the eastern drift being now about 40, and of the western about 80 feet from the shaft. A well developed lead, varying from 3 to 5 feet, has been found so far in both drifts. On Saturday the face of the eastern drift presented a very fine appearance, showing a vein of first-class ore, while the western showed both green and red ore, of which the latter is of much the higher grade, ranging in the neighborhood of $1,000 per ton, while the green yields only from $400 to $600 per ton. East of the main shaft some stoping has been done from a level opened about 25 feet from the surface, and from which ore is hoisted through a smaller shaft sunk on the vein about forty feet to the east of the main shaft. West of the main shaft no stoping has yet been done, the rich ore extending from the water level to within eight or ten feet of the surface. At present only about eight tons of first-class ore per day is taken from the two levels now being run, but when stoping commences from the western level this amount will be very largely increased. The first rich ore was struck at the depth of about eight feet from the surface, and from that point the ore has steadily improved as the depth increased, to water level, where the richest ore yet taken from the mine was found. We await with some interest the developments to be made below water level, but have very little doubt as to the result, being confident that they will prove fully as satisfactory as those above it. The first-class ore from the Gonyon is all sacked for shipment to the east, only the lower grade or second-class being worked here. The different drifts are all timbered in the most substantial manner, the appearance of the mine proving that it is managed by men who understand their business.

The Trout mine is developed by shaft to the depth of 327 feet, with many hundreds of feet of drifts, levels and inclines, from which many tons of ore is being taken with a very small force, and at very small cost. There is a splendid showing of ore in nearly all the openings. No mine in Montana has passed through a more trying ordeal than the Trout, and none have come out more triumphant. Being more than 100 feet below the bed of Trout Creek, and still in good ore, the bugbear of the water level doesn't frighten anybody. The ore vein, although continuous, is like all deposits of ore in lime—very irregular. It occurs in chambers, some of which are very large, but whether large or small, the ore produced is always very rich. I think it would be very hard to find ore more refractory than that taken from the Trout, and yet Mr. Speckart seems to have no difficulty in extracting the silver to a very high percentage of its assay value.

The Algonquin Company will have everything in running order by the 1st of February.

Sterrett & Bro. are putting up a silver arrastra half a mile east of the Algonquin coast.

Holland & Estell intend building a water mill next spring for the reduction of ore from the Emma and Salmon mines.

Waterbury & Brown are shipping ore from Boulder district to the Northwestern Company's mill for reduction at an expense of $12.50 per ton for transportation.

Reliable reports are received to the effect that the Pnilipsburg Company, represented by M. B. Cox, is being reorganized with a fair prospect of resuming operations at an early date.

The Northwestern mill is running regularly and the mine is looking well. The cross cut has been started for the 329-foot level, and at present writing prospects are flattering. The supply of salt on hand will be exhausted by the 1st of April, but hopes are entertained that the supplies on the way will arrive in time to keep the mill running without interruption.

The Hope mine is looking reasonably well. The incline is down about 80 feet and stoping is going on for some 300 feet lengthwise. The body of ore has averaged from 3 to 10 feet and is paying handsomely. The company has in contemplation the substitution of Purvine wooden pans for the iron pans now in use, and the addition of another ten-stamp battery. The mill now disposes of 360 tons per month, but with the proposed improvements could as easily reduce 800 tons per month. The supply of salt on hand will carry the mill through to the end of May or the 1st of June.

NEVADA.

The King Company's affairs in Hamilton County are not yet in shape. A new superintendent has been appointed, and it is hoped that the few thousand dollars of indebtedness, for which the property is now under attachment, will be paid off.

A valuable strike is reported in the Jennie, a base metal mine, on the White Pine Mountain. At a depth of 350 feet 4 feet of fine ore has been found.

The Christy Company, at Silver Reef, made their first bullion shipment of $10,500 on the 2d of January.

Private bullion shipments are now averaging from $15,000 to $20,000 weekly. The Day & Alps mines continue producing finely. The Hillside mine is also looking finely.

A continuation of the big ore chimney of the Eldorado South has been cut in the 800-foot lever of that mine.

The "Two G." mine, at Tybo, is furnishing more ore than its furnace can handle.

A rich strike has been made in the Infidel mine, Cornucopia. A similar good fortune is reported from the Navajo mine, Tuscarora. In the latter property, the ore breast is 50 feet wide, and assays well. Tuscarora is advancing finely.

AMERICAN HARDWARE IN ECUADOR.—Recent advices from Guyaquil state that American hardware is now brought directly in competition with European in Ecuador, its superior quality giving it the preference, although the high rates of freight charged by the monopoly of the Pacific Mail S.S. Co. & Panama R.R. operate very markedly to our disadvantage. To effect a supersedure of the British makes of goods, we must obtain either a reduction of these steam freights or a direct line of sailing vessels.

NOTES.

THE WESTINGHOUSE BRAKE has been adopted by the London, Brighton & Southeast Railway, the initiative order being for 50 engines and 500 cars.

TUBULAR METALLIC FREIGHT CARS are now coming prominently into use. They weigh but half as much as ordinary freight cars, and carry double as much paying weight.

THE BESSEMER INDUSTRY is opening out new lines of progress. At least three of our largest Bessemer rail mills will be increased during the ensuing year, by rolls for angle iron, shafting, etc.

THE PENNSYLVANIA RAILROAD SHOPS AT ALTOONA have a building capacity of one locomotive per day of ten hours. During the year 1877 they built 22 new engines and repaired 224 old ones.

GOLD DISCOVERIES IN WYOMING TERRITORY.—FORT MCKINNEY, W. T., Feb. 1.—Excitement prevails here over new quartz discoveries on Crazy Woman's Creek, twenty-eight miles from this post.

STEAM STREET CARS IN LEEDS.—A new "dummy" made by Kitson & Co., Airedale Foundry, Leeds, has been doing satisfactory work in that town, on trial trips, and it is hoped that permission to run them regularly will be granted.

THE NORTH SEA AND BALTIC CANAL.—Dr. Strousberg proposes to convert Berlin into a seaport by cutting canals between Berlin and the mouths of the Oder and the Elbe. Cost, £8,000,000; supposed annual dividends on investment, 10 per cent.

COMPOUND STEAM PUMPS FOR THE CUBAN AND BRAZILIAN MARKETS.—Recent sales of small compound pumps to the countries above named remind one that the all-important fuel question is leading our neighbors to look more closely into dynamical engineering.

HOW TO MAKE IRIDESCENT GLASS.—The secret of production has leaked out: it consists in the application of dilute acids under high pressure. A recent patent (Clemandot's) calls for a 15 per cent. solution of hydrochloric acid, and a pressure of 75 lb. per square inch.

THE WEST SIX-CYLINDER ENGINE is now used for driving the Gramme dynamo-electric machine direct at 700 revolutions, the piston speed being 325 feet per minute. This obviates the great annoyance of belt-slipping, which is particularly undesirable with such machines.

ANOTHER FEATHERING SCREW PROPELLER (Moysey's, illustrated in *The Engineer*, January 25, page 59) does not differ very materially from several already in model form and patented, save that the movements of partial rotation are effected by hydraulic power, there being a piston in the end of the boss, driving the feathering cranks.

THE ICE SUPPLY in this section of the country bids fair to be very poor and slight this year, and two large ice-cutters on the Hudson are debating the propriety of purchasing ice machines. Those having small ponds will find that the thickness of the ice may be increased by cutting a small hole in the ice and allowing the water to flow over the top and freeze, repeating this plan frequently.

TWEEDLEDUM AND TWEEDLEDEE.—Among the many ridiculously fine points decided upon by the wiseacres of the U. S. Patent Office, was where one inventor evolved from the depths of his inner nature, in 1858, a device by which an envelope was torn open by a thread let in the end and slightly projecting therefrom; and in 1871 it was decided by the office that another inventor, whose mammoth intellect had perhaps been engaged for the 13 years in perfecting the already nearly invaluable invention, was entitled to a patent because he had devised a new and valuable improvement, namely, *tying a knot in the thread*, to enable it to be caught hold of more easily.

THE ANNUAL REPORT OF THE U. S. COMMISSIONER OF PATENTS shows receipts of $732,342.85; expenditures $610,475.12, being less expenditures than for any year since 1871—notwithstanding the fire. There is now in the U. S. Treasury a balance to the credit of the Patent Office of $1,114,222.40. During 1877 there were 20,308 applications for patents and designs (= 390 weekly); there were issued of these, 13,619 (= 262 weekly) or 67 per cent. New York seems to be the most inventive State, fathering 2,496 new ideas; Pennsylvania had 1,515, Massachusetts 1,392, Ohio 1,083, Illinois 1,046, Connecticut 607; Idaho but 1. In the matter of proportion of inventive talent, Connecticut leads, being 1 in 885 of population; no other State having 1 in 1,000. The Commissioner favors dispensing with models except in special cases—so do we. G.

INDEX OF CURRENT TECHNICAL LITERATURE.

EXCHANGES.

[In this department will be given abstracts of the more important original articles contained in current technical periodicals at home and abroad.]

The following gentlemen have kindly consented to assist in making the reviews of current technical periodicals:

JOHN C. RANDOLPH, Mining Engineer, New York.
Prof. TROWBRIDGE, School of Mines, Columbia College, New York.
Prof. H. S. MONROE, " " " " "
Prof. T. EGLESTON, " " " " "
ARTHUR F. WENDT, Mining Engineer, New York.
MANSFIELD MERRIMAN, Yale Scientific School, New Haven, Conn.
FRANKLIN GUITERMAN, Mining Engineer, Cincinnati, Ohio.
Prof. P. deP. RICKETTS, Ph. D., School of Mines, New York.
Prof. E. A. FUERTES, Cornell University, Ithaca, New York.

GENERAL LIBRARY University MICHIGAN

Transactions of the North of England Institute of Mining Engineers, Vol. XXVI., Part VI., August, 1877.—On Cooke's Ventilating Machine, Wm. Cockburn, describing latest form of this machine. Drum of wrought iron revolving on an eccentric horizontal shaft in a circular case of cast-iron plates; case 22 feet in diameter by 11½ feet wide, and inner drum 15 feet in diameter; case smooth and drum accurately fitted, revolving with but 3-32d inch play, 20·30 revolutions per minute; air enters circumference of case at one side and discharged at top; a swinging shutter, curved to fit the eccentric drum in all positions, divides incoming and outgoing currents. Machines used in pairs, to equalize current, and both eccentric drums fastened to same shaft, thus balancing each other. Experiments extending over several months on the work of these machines at two collieries showed over 60 per cent. useful effect, while experiments on Guibal fans, made by the author at ten different collieries, showed but 30 to 50 per cent. useful effect. Other fans tested gave from 41 to 47 per cent. The author therefore concludes that the superiority of machines of varying capacity over centrifugal machines is fairly established. Elaborate tables of experiments and engravings of the machine accompany the paper.

On the Advantages of Certrifugal Acting Machines for the Ventilation of Mines, Wm. Cochrane. A criticism on the above paper, pointing out apparent discrepancies in the results of the experiments, and summing up the advantages of the Guibal system, and the defects of the Cooke Ventilating Machine. Results of experiments are given, showing 58½ to 72 per cent. useful effect from Guibal fans at different collieries. Discussion of the above papers. H. S. M.

Transactions of the North of England Institute of Mining and Mechanical Engineers, Vol. XXVII., Part 1, September and October, 1877.—Description of an Instrument for Leveling Underground, by T. L. Galloway and C. Z. Buning. Two glass tubes, partly filled with colored water and connected by a long rubber pipe, etc. (An abstract of this paper has already been given. See ENGINEERING AND MINING JOURNAL for Sept. 29, 1877, page 245. To facilitate the moving of the tubes and prevent the admission of bubbles of air, two stop-cocks are placed at each end of the rubber tube, and to check the oscillations of the liquid a short piece of tubing of small diameter is inserted.)....Discussion of various papers. (Lubricating coal tubes or cones, etc.)....Visit to the Stonecroft and other lead mines, etc.....Excursion of the Institute.....Brief notice of mines, with methods of working and dressing the ore. Coarse ore jigged, fine ore goes first into classifyers—pointed boxes—then to round buddles and finally to the dolly tub. Engravings of latter apparatus. H. S. M.

STATISTICS OF COAL PRODUCTION.

This is the only Report Published that gives full and accurate returns of the production of our Anthracite mines.

Comparative statement for the week ending Feb. 2, and years from Jan. 1:

TONS OF 2,240 LBS.	1878.		1877.	
	Week.	Year.	Week.	Year.
Wyoming Region.				
D. & H. Canal Co..	40,778	247,995	36,136	163,707
D. L. & W. RR. Co.	40.980	200,958	38,619	171,922
Penn. Coal Co.....	9,708	57,940	17,980	72,848
L. V. RR. Co.....	23,474	98,534	15,019	83,020
P. & N. Y. RR. Co..	512	1,609	1,033	3,451
C. RR. of N. J.....	3,917	72,000	10,268	84,747
	119,369	679,036	119,055	579,695
Lehigh Region.				
L. V. RR. Co.....	65,425	223,959	47,562	186,253
C. RR. of N. J.....	9,982	60,208	13,267	57,132
D. H. & W. B. RR..	674	674	416	416
	76,081	284,841	61,245	243,801
Schuylkill Region.				
P. & R. RR. Co.....	50,206	210,171	69,364	332,644
Shamokin & Lykens Val.....	6,695	33,466	4,458	33,940
	56,901	243,637	73,822	366,584
Sullivan Region.				
Sul. & Erie RR. Co.	632	3,508	227	1,360
Total.....	252,983	1,211,022	254,349	1,191,440
Increase.....	.....	19,582	.....	.....
Decrease	1,366	.....	.....	.....

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent. of the whole production.

Receipts and shipments of coal at Chicago Ill., for the week ending Feb. 2, and year from Jan. 1:

	Week. Tons.	Year. Tons.
Receipts.....	20,000	89,849
Shipments.....	6,164	22,919
Perth Amboy business:		Tons.
Received for the week.....		17,776
Shipped for the week.....		6,827
On hand Feb. 2.....		111,806

The increase of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Pennsylvania Railroads amounts to 9,365 tons as compared with the corresponding period in 1877.

The Exports of Coal from Baltimore for the week ending February 1 were 1,550 tons, and since January 1, 22,994 tons as against 6,483 tons for the corresponding time in 1876.

Receipts of Coal at Boston, for the week ending Feb. 2, and years from Jan. 1:

TONS OF 2,240 LBS.	1878.		1877.	
	Week.	Year.	Week.	Year.
From Alexandria and Georgetown.....	.....	1,479	.....	.....
Philadelphia.....	3,050	32,271	4,400	14,320
Baltimore.....	.....	7,592	.....	2,440
Other places.....	3,915	29,455	8,968	13,806
Great Britain	150	3,441	.....	610
Nova Scotia.....	.....	171	.....	.....
Total.....	7,115	74,409	13,368	31,176

Belvidere Delaware Railroad Report for week ending February 2.

	Week.	Year. 1878.	Year. 1877.
Coal for shipment at Coal Port (Trenton).....	.....	.....	.....
Coal for shipment at South Amboy	10,295	81,496	26,448
Coal for distribution.....	2,953	15,857	17,176
Coal for Company's use.....	3,363	10,053	8,212

The Production of Bituminous Coal for the week ending Feb. 2, was as follows:

Tons of 2,000 lbs., unless otherwise designated.

	Week. Tons.	Year. Tons.
Cumberland Region, Md.		
Tons of 2,240 lbs.....	13,665	75,538
Barclay Region, Pa.		
Barclay R. R., tons of 2,240 lbs.....	2,414	26,110
Broad Top Region, Pa.		
Huntingdon and Broad Top R. R.....	2,147	12,752
*East Broad Top.....	1,113	1,113
Clearfield Region, Pa.		
*Snow Shoe.....	567	567
*Tyrone and Clearfield.....	11,960	11,960
Allegheny Region, Pa.		
*Pennsylvania R. R.....	2,852	2,852
Pittsburgh Region, Pa.		
*West Penn. R. R.....	2,754	2,754
*Southwest Penn. R. R.....	641	641
*Penn & Westmoreland gas coal, Pa. R. R.....	14,627	14,627
*Pennsylvania R. R.....	4,280	4,280

*For the week ending Jan. 7.

The Production of Coke for the week ending Jan. 7:

Tons of 2,000 lbs.	Week.	Year.
West Penn. R. R.....	831	831
Southwest Penn. R. R.....	12,950	12,950
Penn. & Westmoreland Region, Pa. R. R.	1,351	1,351
Pittsburg, Penn. R. R.....	1,736	1,736
Total...	16,868	16,868

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Feb. 8, 1878.

Anthracite.

The cold weather which ruled last week encouraged the coal trade to believe that it would still be favored with a fair amount of severe weather, but these hopes have again been dashed by the mild weather that has been given us this week.

The consumption of coal for domestic uses is about as small as it could be in winter months, while manufacturers have, since the middle of December, been but moderate consumers. Stocks with dealers and consumers are quite large for this season of the year, while those with producers are decreasing but little, if any. To an exhaustion of coal "on the market" is looked for better prices, but somehow there appears to be additional lots constantly placed there. Prices are a little better now than a week ago, being about 30 @40c. under printed circulars.

The Lehigh operators held a meeting at Bethlehem on Wednesday to decide upon a sub-division of the allotment of production made to the Lehigh Valley Railroad Company by the combination. The basis of division fixed upon was the largest monthly shipment in both 1876 and 1877. A committee was appointed with discretionary powers to determine the allotment of newly-opened colleries.

Although this year there is a coal combination to control production, and the requirements of the market are not so great as they were a year ago, yet the decrease in the output last week was but 1,366 tons, as compared with the corresponding week of last year. The total production this year shows an increase of 19,582 tons, as compared with the like period of 1877.

Bituminous.

There is nothing worthy of notice in the business in this coal, the new orders being mostly for single cargoes.

A bill amending the mining laws of Maryland has passed the Legislature of that State, and is receiving considerable discussion by the miners and operators. According to the amendment proposed, as published

in a local paper, it shall be unlawful for any mining company to defraud a miner by the use of other than accurate scales, or to wrongly account for the coal weighed. We are not familiar with the laws of the State of Maryland, but should judge them very deficient if they do not already make provision for punishing such frauds.

We are informed, however, that the bill as it passed the Legislature provides that the "miner's ton" shall be 2,240 lb. instead of the one determined upon by the miners and mine owners, as sufficient to cover wastage, and upon which wages are based. This appears another matter of useless interference on the part of the Legislature, for, determine upon what they may, the miners will receive no greater wages for a month's work. If the "ton" be reduced in quantity the wages will be reduced correspondingly.

The leading feature to the bill, however, is the ventilation section, which requires that 100 cubic feet of air per minute to each person and animal employed be distributed throughout the mines. The provisions are such as to necessitate considerable expenditures on the part of the companies, in several cases probably making it more economical to abandon the coal than attempt to comply strictly with the contemplations of the act. At all events, it would bring much inconvenience to the companies, besides adding an additional sum to the cost of producing. Judging from the record of accidents, explosions and suffocations, which would come under the control of a mine inspector, and which have occurred in the Cumberland region, it would be an injury to the miners, instead of a benefit, for where they have now but an imaginary grievance they would have a real one in being compelled to stand a part of this increased cost, in the necessity that would then exist for a further reduction in their wages, while the only person to be benefited would be the mine inspector, with the sinecure of $1,500 per annum. This office has borne very much the appearance of being created for the purpose of extending political patronage, and while the abuses are not sufficient to bring prominently to notice the officer, he is likely to make himself disagreeably officious to give permanency to the office.

We cannot but approve of good ventilation in mines, but regulations that may be necessary to the gaseous mines of Pennsylvania and other districts are to a great degree oppressive in the Cumberland region, where gases, explosions and suffocations are unheard of occurrences. The object of the bill appears to be to give importance to an office created to correct imaginary abuses, and to establish 2,240 lb. as a "miner's ton."

New York.

Wholesale Prices of Anthracite Coal f. o. b. at Tide Water Shipping Ports, per ton of 2,240 lbs.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
WYOMING COAL.						
Lackawana, at Weehawken	$3 25	$3 25	$3 25	$3 35	$3 75	$3 50
*Pittston, at Weehawken	3 25	3 25	3 25	3 35	3 75	3 50
Wilkesbarre, at Port Johnson	3 25	3 25	3 25	3 35	3 75	3 25
Lehigh Valley Coal Co., at Amboy	.....	3 50	3 25	3 35	3 75	.....
Plymouth R. A., at Port Johnston	.....	.....	3 25	3 45	3 85	3 35
LEHIGH						
Old Company's, at Port Johnston	3 75	.....	3 40	3 50	3 75	3 25
Honey Brook Lehigh, at Port Johnston	3 75	.....	3 40	3 50	3 75	3 25
Lehigh Valley Coal Co., at P. Amboy	3 75	.....	3 50	3 50	3 75	3 25
Mount Pleasant, at Hoboken	3 50	.....	3 50	3 50	3 75	3 00
Hazelton, at Hoboken	3 50	.....	3 50	3 50	3 75	3 00
Cross Creek, at Port Johnston	3 75	.....	3 50	3 50	3 75	3 20

* Forty cents per ton additional for delivery in New York.

Wholesale Prices of Bituminous Coal.

DOMESTIC GAS COALS.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Pennsylvania—		
At Greenwich, Philadelphia	$4 70	$5 50
At S. Amboy	5 00	5 50
Kanawha at Richmond	4 10	5 40
Red Bank Cannel, Pa., at Philadelphia	8 00	8 50
Youghiogheny, Waverly Co., at Balt	4 50	5 65
Despard, West Va	4 50	6 00
Murphy Run, West Va., at Baltimore	4 50	5 85
Fairmount, West Va., " "	4 40	5 70
Newburg Orrel. Md. " "	4 50	6 00
Cannelton Cannel, West Va	....	10 00
" Splint " at Richmond.	6 00	7 00
" Gas Coal at Richmond	4 00	5 65
Peytona Cannel, W. Va., at Richmond	....	10 00

MANUFACTURING AND STEAM COALS.

Cumberland at Georgetown and Alexandria	2 85@3 10	4 35@4 50
Cumberland, at Baltimore	3 10@2 25	4 35@4 50
Cl'rfi'd "Eureka" and "Franklin."		
At mines	0 75	....
At Baltimore	3 25	4 50
At Philadelphia	3 25	4 50

FOREIGN GAS COALS.

	Sterling.	Am. cur'ncy.
Newcastle, at Newcastle-on Tyne	8s.6d.@10s.6d.	$5 50@ $6 00
Liv. House Orrel, at Liv.	25s.	13 00
Ince Hall Cannell "	35s.6d.	18 00
" Gas Cannel "	25s.6d.	10 00@ 10 50
Scotch Gas Cannel, at Glasgow, nominal	25s.	7 50
	Gold.	
Bl'k House, at Cow Bay, N.S.	$1 75	$4 50
Caledonia, at Pt. Caledonia	1 50	4 25
Glace Bay, at Glace Bay	1 60	4 25
Lingan, at Lingan Bay	1 75	....
Intern'l Mines, at Sydney	1 75	4 50
Pictou, Vale Mines, at Pictou	2 00	4 70

Retail Prices.

Per ton of 2,000 lb,

Anthracite.

	G. & Egg.	Stove.	Chest.
Pittston coal delivered	$5 00	$5 00	$5 00
Lack. coal, delivered below 59th St.	4 50	4 50	4 50
Wilkes-Barre, delivered above Canal Street	4 50	4 75	4 50
Wilkes-Barre, deliv'd below Canal Street	4 25	4 50	4 25
Lehigh and Locust Mountain, delivered above Canal Street	5 00	5 00	4 75
Lehigh and Locust Mountain, delivered below Canal Street	4 50	4 75	4 50

Bituminous.

Liv. House Orrel	$18 00	American Orrel	$11 00
Liv. House Cannel	18 00	Red Bank Cannel	7 00
Am. " "	11 00	Cumberland	9 00
Ca'n'lt'n Bl'k, or splint.	10 00		

Baltimore. Feb. 7, 1878

[Specially reported by Messrs. E. STABLER, Jr., & Co.]

Wholesale Prices per ton of 2,000 lbs.

In cars at Depot N. C. R. R.

HARD WHITE ASH, FREE-BURNING WHITE ASH, SHAMOKIN, ETC.

Lump and Steamboat	$3 80	Stove	$4 10
Broken	3 90	Chestnut	3 70
Egg	4 00		

LYKENS VALLEY RED ASH.

Broken, Egg and Stove.	$4 30	Chestnut	$3 90

From yard or wharf to dealers, 50@75c. per ton additional for all kinds and sizes.

Boston. Feb. 4, 1878.

Continues very dull.

We quote wholesale prices as follows:

Anthracite, broken	$4 80	Caledonia	$4 50
do egg	4 80	Cannel, English	18 00
do stove	5 30	do Library	15 00
Franklin	5 75	do Buckeye	11 00
Cumberland	4 90 5 00	Penn	6 25
Clearfield	4 75 4 90	Youghiogheny	6 25
Westmoreland	6 25		

[*Commercial Bulletin.*

Buffalo, N.Y. Feb. 8. 1878.

[Specially reported by C. M. UNDERHILL.]

The Delaware, Lackawanna & Western Railroad Co. will sell their Scranton coal, the Delaware & Hudson Canal Co. will sell their Lackawanna coal, and J. Langdon & Co. will sell their Henry Clay and Mount Carmel Black Diamond coals, at the following prices per ton of 2,000 lb. for Buffalo local trade for the present:

	To DEALERS.		To CONSUMERS.
	On car or boat.	In yard, screened.	Delivered at yard. Retail.
Grate	$4 20	$4 30	$5 45
Egg	4 20	4 30	5 45
Stove	4 45	4 55	5 70
Chestnut	4 35	4 45	5 60
Blossburg	3 85	4 35	5 00

[Specially reported by LEE & LOOMIS.]

Per ton of 2,000 lb. delivered on cars.

	Lump.	Run of Mine.	Nut.	Slack.
Connellsville coke	$5 00	.....	.....	.....
Brookfield Coal	3 55	.....	.....	.....
Brier Hill	3 55	.....	.....	.....
" " 2d quality	3 30	.....	.....	.....
Youghiogheny	4 00	.....	.....	.....
Monterey	.....	2 85	.....	2 00
Catfish	.....	2 85	.....	2 00
Stoneboro'	.....	.....	2 75	2 00
Sterling Cannel	5 00	.....	.....	.....

Cleveland, O. Feb. 6, 1878.

[Specially reported by F. A. BATES, Esq.]

Per ton of 2,000 lb. f.o.b. vessels.

WHOLESALE.

Brier Hill (Church Hill)	$3 30
" " No. 2 Grades	3 10
Straitsville Lower Vein	2 75
Hocking Valley	2 75
Massillon (No. 2 grades 15 cents less)	2 75
Tuscarawas Valley	2 30
Columbiana	2 30
Nut coal, various grades	$1 90@2 20
Screenings " "	1 35@1 75
Youghiogheny gas coals	3 75

RETAIL TRADE.

	1 to 10 tons	Upw'd
	Tons.	
Brier Hill lump	$4 60	3 75
Massillon and Mineral Ridge lump	3 75	3 50
" " " nut	3 50	3 25
Straitsville Lower Vein and Hocking lump	3 60	3 35
" " " nut	3 40	3 15
Rich Hill lump	3 50	3 35
" " nut	3 25	3 00
Columbiana, lump	3 00	2 75
" nut	2 50	2 35
Lacka'a., Wilkes-Barre and Pittston egg and grate	6 10	5 85
Lackawanna, Wilkes-Barre and Pittston stove	6 25	6 00
" " " chestnut	6 25	6 00

Lehigh $1 per ton higher.

All sales to be strictly cash with order or C.O.D.

Chicago, Ill. Feb. 7, 1878.

[Specially reported by Messrs. RENO & LITTLE.]

Retail prices of coal delivered per ton of 2,000 lb.

Lakawanna Stove	$6 75	Erie and Brier Hill	$5 50
" Chestnut	6 75	Wilm'gton & Ill.	$3 50@4 00
" Grate	6 75	Blossburg	6 50
" Egg	6 50	Piedmont	7 50

Cincinnati, O. Feb. 6, 1878.

[Specially reported by the Consolidated Coal & Mining Co.]

Per bushel of 72 lbs.

	Retail delivered.	Wholesale afloat.
Youghioghney	11c.	7½c.
Camden	9c.	5½c.
Cannel	17@18c.	13c.

Anthracite, delivered, $7@$8 per ton of 2,000 lbs.

Hamilton, Ont. Feb. 7, 1878.

[Specially reported by H. BARNARD.]

Retail prices delivered per ton of 2,000 lb.

Scr. or Wilkes-B. Grate	$5 00	Lehigh Lump	$6 00
" " Egg	5 00	Brier Hill	5 50
" " Stove	5 25	Massillon	4 50
" " Nut	5 25	Smithing	5 50

Indianapolis, Ind. Feb. 6, 1877.

[Specially reported by Messrs. COBB & BRANHAM.]

WHOLESALE BITUMINOUS.

On board cars, per ton of 2,000 lb.

White River	$2 65	Hocking Valley	4 25
Brazil Block	2 60	Raymond City	4 60
Highland, grate	2 25	Youghiogheny	4 60
Indiana Cannel	4 60	Blossburg (smithing)	6 10
Peytona	5 75	Piedmont "	6 10

Per car, 12 tons.

Block coal, nut	$18 00	Block Slack	$17 00
Highland, "	18 00		

RETAIL BITUMINOUS.

Delivered per bushel of 70 lb.

White River	13c.	Block Nut, steam use	8c.
Brazil Block	13	" Slack, "	7
Highland Grate	11	Virginia Cannel	25
Block Nut, domestic use	11	Youghiogheny	18
Highland Nut, " "	11	Blossburg	26
" " steam	8		

GAS COKE.

Per bushel, measure containing 2,888 cubic inches.

Retail, crushed	14c.	Wholesale	9c.
" lump	12		

ANTHRACITE.

Per ton of 2,000 lb.

Wholesale on Cars.		*Retail delivered.*	
Wilkes-Barre, all sizes	$5 75	Wilkes-Barre, all sizes	$7 50
Lackawanna, "	6 25	Lackawanna, "	7 00
Lehigh "	6 75	Lehigh, "	7 00

Louisville, Ky. Feb. 6, 1878.

[Specially reported by Messrs. BYRNES & SPEED.]

Wholesale per bushel of 72 lb.

Pittsburg	8c.	Raymond City	7½c.
Ashland (Ky.)	7	Kentucky, on cars	8

Retail.

Pittsburg	$3 00	Anthracite, per ton	$7 50
Raymond City	2 75	City Made Coke, per bsh	7c.
Ashland (Ky.)	2 50	Soft Coke, per bushel	7c.
Pittsburg nut	2 50		

Montreal. Feb. 7, 1878.

[Specially reported by Messrs. ROBERT C. ADAMS & Co.]

Wholesale per 2,240 lb.

Scotch Steam	$4 75	Cape Breton Steam	$4 25
Pictou	4 50	Newcastle Smith's	6 00

Anthracite at retail, per 2,000 lb. delivered.

Stove	$6 00	Chestnut	$5 75
Egg	5 75		

Milwaukee, Wis. Feb. 6, 1878.

[Specially reported by Messrs. R. P. ELMORE & Co.]

Retail price per ton of 2,000 lb.

Anthracite, Egg, Chestnut and Stove	$6 50		
Lehigh lump	$7 00	Connellsville coke on	
Brier Hill	5 25	RR. track	7 25
		Straitsville	4 80

New Orleans, La. Feb. 1, 1878.

Coal on hand February 1: Pittsburg coal, 95 boats and 6 barges; St. Bernard coal, 2 boats. Consumption during January: 43 boats, 7 barges and 1 French creek of Pittsburg coal. Arrivals during January: 66 boats and 8 barges of Pittsburg coal.

[Specially reported by Messrs. C. A. MILTENBERGER & Co.]

PITTSBURG COAL.

At wholesale (by boat-load)	35c. per bbl. of 180 lb.
To steamboats	50c. " "
" manufactories	50c. " "
" families	75c. " "
In hhds. (for shipment)	$7 per hhd. from 5 to 6 bbls.

ST. BERNARD (KY.) COAL.

To steamboats	45c. per bbl. of 180 lb.
" families	65c. " "

ANTHRACITE COAL.

Per ton of 2,000 lb.

At wholesale	$7 00 to $8 00
" retail	11 00 to 12 00

Pittston, Pa. Feb. 7, 1878.

Pennsylvania Coal Company's Coal in Yard.

Retail per ton of 2,000 lb.

Lump, Egg, and Stove	$2 25
Chestnut	2 00
Pea	1 00

Delivered, 50 cents per ton additional.

Richmond, Va. Feb. 7, 1878.

[Specially reported by S. H. HAWES, Dealer in Coal.]

Per ton of 2,240 lb. f.o.b.

Kanawha Cannel	$9 00	New River Bituminous	$3 70
Coalburg Splint	5 70	Clover Hill Coal	3 00
Lewiston	5 70	Norwood Gas and	
Kanawha Gas Coal	4 90	Steam Coal	2 70

San Francisco, Cal.

From the *Commercial Herald*, February 1, 1878:

We have tried hard to get statistics from the Coos Bay, Bellingham Bay and Mt. Diablo mines as to their actual production in 1877, but the figures do not seem to be forthcoming. The same remarks will apply to the mines of British Columbia, but we find the following in that wide-awake paper, the *Pacific Tribune*, printed in Seattle, Washington Territory:

"VANCOUVER COAL COMPANY.—At the half-yearly meeting of the shareholders of the company, held at London, on November 27, the directors recommended a dividend for the half year of five per cent. per annum, The output for the six months was 43,000 tons, and the sale of coal 37,235 tons. If we are correctly informed, this is the first dividend paid by that company. Though it has been in active operation for nearly twenty years, and has mined considerably over a million tons of coal, which has found ready sale at the highest prices, all the money it has made, and more, has been put into the development, improvement and building up of the Company's mine, town, works, etc., at Nanaimo. In this they have spent a fabulous sum of money, and have at this time got a piece of property in which "there is millions." By reason of the late rains and heavy storms we have but few arrivals to note from any quarter. We have before noted a cargo sale of Wellington to the Gas Company at a low figure by way of experiment. Since then we have no report. Our spot stocks of all kinds are liberal, causing very low prices to prevail, and, what is more, we are credibly informed that dealers seem to be afraid to issue orders for Scotch or English cargoes to arrive next fall or summer at a price that will begin to cover cost or freights; no, not within several dollars per ton what they have heretofore considered perfectly safe figures for even the best family or household coals. The fact is that the promised output for 1878 from Washington Territory mines and those of British Columbia is so very great that low prices must prevail on this coast in future. Several of our steamship lines, railroad companies, and other large coal consumers have already made contracts for their use in 1878 at very low figures. The *Pacific Tribune*, now before us, copying our late remarks about Seattle coal being retailed at $10 per ton, adds: "We can inform our San Francisco contemporary that Seattle coal can be sold in that city at a fair rate of profit for $8 a ton, and probably will be inside of a twelve month. When that is done the market will be shut to importations from Chili, Australia and Great Britain, and Seattle coal for steam and household purposes will reign supreme. The Seattle Company has now in its mine fifty thousand tons of coal cut and ready for shipment, which, after the completion of the railroad in February, it can take into the port of San Francisco at the rate of over a thousand tons a day, the whole cost of the mining and transportation of which will not exceed $4.50 a ton, and thereafter they can supply unaided every ton of house and steam coal wanted in the city at about the same rate. There is no other mine on the coast with facilities for extensive and cheap, working equal to those of the Seattle Company." The writer of the above overlooks the fact that dealers here in delivering coal to families at $10 per ton (2,000 lb.) oftentimes have to cart it perhaps two miles, sack it, and then carry it into the house or cellar, so that, all things considered, $10 for coal delivered is very cheap to house consumers. Yet we know that cargoes afloat have been sold as low as $6, the freight on which from the mines to the city can not be less than $2.50 to $3.50 per ton. We quote the present cargo price of English steam afloat at $6.50 to $6.75; West Hartley, $8.50; Anthracite, $13. We have now to report the sale of one-half the cargo of the ship Three Brothers—say 1,750 tons—to be delivered at Oakland Wharf at $6.62½. Since writing the foregoing we are informed that the Seattle Coal Company have made a contract with the Central Pacific Railroad Company to deliver them their year's supply—say 5,000 tons monthly, or more if required, average quality at $5.50 per ton; screenings, $4. This would seem to settle the question of low-priced coals for 1878.

Sandusky, Ohio. Feb. 6, 1878.

[Specially reported by C. E. BLACK, Agent Con. Coal and Mining Company.]

We quote coal on cars at Sandusky, as follows:

Per ton of 2,000 lb.

ANTHRACITE.

	Grate.	Egg.	Stove.	Chest.
Lehigh	$6 50	$6 50	$6 50	$6 50
Wilkes-Barre	5 75	5 75	5 75	5 75
Lackawanna	5 75	5 75	5 75	5 75

BITUMINOUS.

Massillon	$3 00	Straitsville	$2 70
Del Carbo	2 75	Shawnee	2 70
Hocking Valley	2 70	Blossburg	4 75

Prices retailed delivered 50c.@75c. above car prices.

St. Louis, Mo. Feb. 6, 1878.

[Reported by JAMES J. SYLVESTER, Secretary of the Anthracite Coal Association.]

Retail prices, delivered. Ton of 2,000 lb.

ANTHRACITE.

	Per ton.		Per ton.
Lackawanna	$8 00@8 50	Schuylkill	$8 00@8 50
Wilkes-Barre	8 00@8 50	Lehigh	9 00@9 50

BITUMINOUS.

Blossburg	$9 00	Big Muddy	$3 00
Pittsburg	4 50	Illinois Coals	2 50@3 00
Indiana Block	4 00	Connells. Coke	6 50

Toledo, Ohio. Feb. 6, 1878.

[Specially reported by Messrs. GOSLINE & HARBOUR.]

We report prices of coal on cars at Toledo as follows:

Ton of 2,000 lb.

Straitsville lump	$2 70	Hocking Valley nut	$2 30
" nut	2 30	Massillon lump	3 00
Shawnee lump	2 70	Cumberland	5 40
" nut	2 30	Blossburg	5 40
Hocking Valley lump	2 70		

Prices of hard coals on cars at Toledo areas follows:

Ton of 2,000 lb.

	Grate.	Egg.	Chestnut.	Stove
Pittston	$5 55	$5 55	$5 70	$5 80
Wilkes-Barre	5 55	5 55	5 70	5 80
Lackawanna	5 55	5 55	5 70	5 80
Lehigh	6 15	6 15	6 30	6 40

For retail delivery in city the prices are as follows: Stove and chestnut $6.45; grate and egg, $6.20 per ton; Lehigh 60c. per ton additional.

Prices soft coal f.o.b. vessel for Lake shipments will be from 15 to 20c. per ton more than prices on cars.

OFFICE OF THE PA. & N. Y. R. R. Co.,
Bethlehem, Feb. 1. 1878.

On and after this date the rate on coal for Buffalo, Watkins, Ithaca and Weedsport, for water shipment; Auburn, for New York Central Railroad; Sterling, for Lake Ontario Shore Railroad, and Fair Haven, will be $1 per gross ton, between Coxton and Waverly. On coal for Rochester, via Erie R. W., Salamanca and points west thereof, an additional charge of 10 cents per ton will be made to cover transhipment charges at Waverly. The full rate from Coxton to Buffalo is $2.75, to Rochester $2.47. Local rates of August 6 will go into effect the same date.

ROBERT H. SAYRE, President.

Freights.

Per ton of 2,240 lb.

Representing the latest actual charters to Feb. 7, 1878.

PORTS.	From Philadelphia.	From Baltimore.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me			
Albany			
Alexandria, Va			
Brooklyn, N. Y			
Bangor, Me			
Bath, Me			— $1 50
Baltimore			
Boston, Mass		$1 60	1 50
Bridgeport, Conn.		1 40	70
Bristol, R. I			90
Beverly, Mass			1 50
Cambridge, Mass.			1 50
Charleston, S. C.			
Danversport, Mas			
East Cambridge, Mass			
Fredericksbrg, Va			
Fall River		1 40	90
Gloucester			
Georgetown, D.C.			
Hartford, Conn.			
Hoboken			70
Hudson, N. Y			
Jersey City			40
Lynn, Mass			
Marblehead, Mass			
Middletown			90
Milton, Mass			
Nantucket, Mass.			90
New Bedford		1 40	90
Newburyport		1 75	1 75
New Haven		1 40	70
New London		1 40	70
Newport			90
New York	$1 15†	1 30	40
New Orleans, La.			
Norfolk, Va			
Norwich			90
Norwalk, Conn			1 00
Philadelphia			
Portland		1 60	1 50
Portsmouth, N.H.		1 75	1 65
Providence		1 40	90
Quincy P'nt, Mass			
Rockport			
Richmond, Va			
Saco			
Salem, Mass		1 60	1 50
Saybrook, Mass			
Savannah, Ga			
Somerset, Mass			90
Troy			
Wareham			
Washington			
Wilmington, N.C.			
Wilmington, Del.			

* And discharging and towing. † And discharging. ‡ And towing. § 3c. per bridge extra.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Feb. 8, 1878.

American Pig.—In this article this market has been very quiet, the sales aggregating but a few hundred tons at our quotations. In Philadelphia a sale of 10,000 tons of Allentown iron is reported to have been made to speculators on private terms. The question of the cost of fuel is undoubtedly having a depressing effect upon the iron trade, preventing the iron masters from contracting ahead, owing to their inability to judge the future cost of making iron, while buyers have but little faith in the coal combination, and are unwilling to purchase largely at an advance. We quote No. 1 foundry at $18@$19; No. 2 foundry $17@$18; and forge, $16@$17.

Scotch Pig.—We note a sale of 100 tons of Glengarnock, on private terms, and sundry small lots at about quotations. The market is very quiet and prices unchanged. We quote as follows: Eglinton, $23@23.50; Coltness, $25.50@26; and Glengarnock, $24.

Rails.—We are informed of sales of 3,000 tons of steel at $43 at Amboy, and 2,500 tons at works on private terms. There is a growing firmness on the part of the mills, the feeling being that there will be an abundance of work this year for all the working mills. It is estimated that the sales for this year's delivery amount to about 350,000 tons, while there is still a liberal prospective business, numerous inquiries being in the market at present. Iron rails continue to be very quiet, and are quoted at $33@$36 at the mills, while steel is now quoted at $42@$43.

Old Rails.—We learn of no business here, although there are considerable inquiries for delivery at Philadelphia at prices slightly under the views of such sellers as are in the market. We quote, for New York delivery, at $20.

Wrought Scrap.—The Erie Railway has sold 500 tons of scrap at, it is said, 1c. per lb. We quote at $22@$23.

Baltimore, Md. Feb. 4, 1878.

[Specially reported by Messrs. R. C. HOFFMAN & Co.]

Below we give you closing quotations for pig iron and blooms with moderate demand.

Balt. Char.	$29 00@$30 00	M. & White	$14 00@$15 00
Va. "	28 00@ 30 00	C'lC.B.Blooms	50 00@ 55 00
Anth. No. 1	19 00@ 20 00	" " Billetts	55 00@ 60 00
" " 2	18 00@ 19 00	Refi'd Blooms	45 00@ 50 00
" " 3	17 00@ 18 00		

Buffalo. Jan. 31, 1878.

[Specially reported by Messrs. PALEN & BURNS.]

This market is quite inactive although iron is quoted at the following low prices for reliable brands on cars here, four months.

No. 1 Foundry	$20 91
No. 2 "	19 91
Gray Forge	18 91
American Scotch A 1	24 25
Cherry Valley B 1	23 25
" " No. 2	22 25

Chattanooga, Tenn. Feb. 4, 1878.

[Specially reported by J. F. JAMES, dealer in iron & metals.]

Tenn., Ala. & Ga. Charcoal, No. 1 Foundry	$18 00@$19 00
Tenn., Ala. & Ga. Charcoal, No. 2 Foundry	17 00@ 18 00
Tenn., Ala. & Ga. Charcoal, Gray Forge	15 00@ 16 00
Tenn., Ala. & Ga. Coke, No. 1 Foundry	19 00@ 20 00
Tenn., Ala. & Ga. Coke, No. 2 Foundry	17 00@ 18 00
Tenn., Ala. & Ga. Coke, Gray Forge	15 00@ 16 00
Tenn., Ala, & Ga. cld B. (car-wheel)	20 00@ 28 00
Charcoal or Coke, white and mottled	14 00@ 15 00

Old rails	$18 00@$19 00	Wr'ght scrap,	
Old car wh'ls.	16 00@ 17 00	No. 2	$12 00
Wr'ght scrap,		Cast scrap	10 00
No. 1	17 00	Muck bar	32 00@ 33 00

Iron Ores.

Red Hematite (about 55 per cent. metallic iron) f. o. c. at mines	$1 25
Brown Hematite (about 55 per cent. metallic iron)	1 75

Cincinnati, O. Feb. 5, 1878.

[Specially reported by Messrs. TRABER & AUBERY, Commission Merchants for the sale of pig iron, blooms, ore, etc.]

Below please find closing quotations of our pig iron market, viz.:

CHARCOAL.

H'n'g Rock	No. 1 Foundry & B 1	$22 00@$23 00	—4 mos.
"	No. 2 "	21 00@ 22 00	—4 mos.
"	Soft Silver Gray	20 00@ 21 00	—4 mos.
"	Mill	18 00@ 19 00	—4 mos.
Tennessee	No. 1 Foundry	21 00@ 22 00	—4 mos.
"	No. 2 "	20 00@ 21 00	—4 mos.
"	Mill	18 00@ 19 00	—4 mos.

STONE COAL.

Ohio	No. 1 Foundry	$20 00	—4 mos.
"	No. 2 "	19 00	—4 mos.
"	Nos. 3 and 4 "	18 00@ 17 00	—4 mos.
"	Mill	18 00	—4 mos.

COKE.

Ohio & W. Va.	No. 1 Foundry	$21 00@$22 00	—4 mos.
" "	No. 2 "	20 00@ 21 00	—4 mos.
" "	Mill	18 00@ 19 00	—4 mos.

CAR-WHEEL.

H'n'g R., C. B.	Hecla, Vesuvius, Etna.	$38 00	—4 mos.
Maryland,	" Cedar Point	37 00	—4 mos.
Missouri,	" Maramec	30 00	—4 mos.
Alabama,	" Woodstock	32 00	—4 mos.

BLOOMS.

Charcoal	$45 00@$50 00—cash.

SCRAP IRON.

Cast	40 c.@ 45c.—cash.
Wrought	62½c.@$1 00—cash.

Columbus, Ohio. Feb. 4, 1878.

[Specially reported by Messrs. KING, GILBERT & WARNER, dealers in Pig Iron and Ores.]

There are no new features to note in this market during the past week. The demand has been fair and prices unchanged. The new furnace at Moxahala is now making

200 tons per week of extra No. 1 foundry iron. The usual time, four months, allowed on quotations.

FOUNDRY IRONS.

No. 1 Hanging Rock Charcoal	$23 50@$24 00
No. 2 " " "	22 00@ 22 50
No. 1 Hocking Valley soft and strong from pure limestone ores	21 50@ 22 00
No. 2 Hocking Valley soft and strong from pure limestone ores	20 50@ 21 00
No. 1 American Scotch	20 50@ 21 00
No. 1 Moxahala	21 50@ 22 00
No. 2 "	20 50@ 21 00
No. 1 Shawnee	20 50@ 21 0
No. 1 Eliza (Jackson County)	20 50@ 21 00
Silver Gray	18 00@ 19 00

MILL IRONS.

Gray neutral	18 50@ 19 00
Mottled and white neutral	17 50@ 18 00
Gray cold short	17 50@ 18 00
Mottled and white cold short	16 50@ 17 00

Cleveland, O. Feb. 4, 1878.

[Specially reported by Messrs. C. E. BINGHAM & Co.]

Per gross ton, on four months' time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.

No. 1 L. S. Charcoal	$25 00	Am. S., No. 1, Ch. Val.	$24 00
No. 2 " "	25 00	" " B—1, " "	23 00
No. 1 Anthracite "	23 00	" " No. 2 " "	22 00
No. 2 "	21 00	No. 1, Massillon	24 00
No. 1 Bituminous	23 00	B—1, "	23 00
No. 2 "	21 00	No. 2, "	22 00

CAR-WHEEL AND MALLEABLE IRON.

No. 3, L. S. Charcoal	$26 00	No. 5 & 6, L. S. Char.	$27 00
No. 4, " "	26 00		

BESSEMER IRON.

No. 1 & 2, L. S. Char.	$25 00

FORGE IRON.

No. 1, Gray	$20 00	White and Mottled	$19 00

Louisville, Ky. Feb. 5, 1878.

[Specially reported by Messrs. GEORGE H. HULL & Co.]

A good business was tronsacted during January in all grades of pig metal, but without change in prices. Prospects for a good spring trade encouraging. The usual time, four months, allowed on quotations below :

FOUNDRY IRONS.

	No. 1.	No. 2.
Hanging Rock Charcoal	$22 00@$23 00	$20 00@$21 00
Southern Charcoal	20 00@ 21 00	19 00@ 20 00
H'n'g Rock, Stc'l & Coke	20 00@ 22 00	19 00@ 20 00
Southern Stonecoal & Coke	19 00@ 20 00	18 00@ 19 00
"American Scotch"		20 00@ 22 00
Silver Gray		18 00@ 19 00

MILL IRONS.

No. 1 Charcoal, Cold-short & Neutral	$18 00@$19 00
No. 1 Stc'l & Coke, Cold-short & Neutral	17 00@ 18 50
No. 2 Stc'l & Coke, Cold-short & Neutral	16 00@ 17 00
No. 1 Missouri and Indiana, Red-short	20 00@ 22 00
White & Mottled, Cold-short & Neutral	14 00@ 16 00

CAR-WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold Blast	$34 00@$37 00
Alabama and Georgia, Cold Blast	24 00@ 33 00
Kentucky, Cold Blast	25 00@ 33 00

Milwaukee, Wis. Feb. 4, 1878.

[Specially reported by Messrs. R. P. ELMORE & Co.]

CHARCOAL IRON.

No. 1 Lake Superior per gross ton	$23 00—4 mos.
" 2 " " " "	22 00—4 mos.

ANTHRACITE IRON.

No. 1 Anthracite per gross ton	24 00—4 mos.
" 2 " " "	23 00—4 mos.

STONE COAL AND COKE.

Warner's Am Sc'th (Bk. Band, per ton	$25 00@ —4 mos.
Soft Silvery per ton	22 00@23 00—4 mos.
Ohio Stone Coal	22 00@23 00—4 mos.

CAR WHEEL.

Lake Superior ores per ton	$25 00@27 00—4 mos.

Philadelphia, Pa. Feb. 7, 1878.

[Specially reported by JUSTICE COX, JR., & Co., Iron Merchants, 333 Walnut street, Philadelphia.]

Pig Iron.—The market for pig iron is dull and void of interest with the exception of the reported sale of 10,000 tons Allentown iron, price and terms withheld. If this should be so, and we have every confidence it is, and this iron is not yet molded, it will put this company out of the market for some months to come, and will make iron just that much firmer in price. With this exception, the sales have been for immediate delivery and only in small lots. We report sales of 2,000 tons independent of the 10,000 spoken of above; market firm, and quote we No. 1, $18 to $20; No. 2, $17 to $18; No. 3, $16 to $18.

Manufactured Iron.—The demand for bars is not as good as it was hoped the new month would bring; orders for small lots continue to come in, nothing large being reported. The happy day looked forward to when Congress will adjourn, may bring the business the country should be doing to-day, and only held back for fear of the tariff and silver bill. Plates, tank and skelp are as with bars—only small orders for prompt delivery. We quote bars 2 to 2 1-10c. per lb.; plate and tank, 2⅛ to 6c. per lb.; skelp, 2 1-10 to 2¼c.

Rails.—In steel rails nothing new is reported; the fair feeling reported last week continues, and orders only at full quoted prices are accepted. We quote $41 to $43 at mills.

Iron Rails.—The demand and sale for iron rails is limited to small lots for immediate delivery. We quote $33 to $35 at mills.

Old Rails.—The demand for old rails continues, and full frices are offered for spot lots. Lots to arrive are not bringing as full prices. The scrap class in the new tariff bill is affecting old rails. We quote $20 to $21.

Scrap.—The lots of wrought scrap pressing on the market are bringing low prices. Cast remains nominal. We quote wrought, $20 to $24; cast, $12 to $16.

Muck Bars are quoted $33 to $35, as to quality and delivery.

Pittsburg, Pa. Feb. 5, 1878.

[Specially reported by A. H. CHILDS.]

In consequence of the long continued dullness, prices have been growing weaker for some time past, and the market is now from 50c. to $1.00 per ton lower than when the year opened. Quotations are :

4 mos.		4 mos.	
No. 1 F'dry	$20 00@$21 50	M. & White	$16 00@$17 00
No. 2 "	19 00@ 20 00	Hot Blast Ch.	20 00@ 25 00
Gray Forge	17 50@ 20 00	Cold Blast W.	@ 35 00

St. Louis, Mo. Feb. 5, 1878.

[Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.]

Pig iron business the past week has been dull, but the prospect is good for a fair business this spring, but at very low prices. Old rails are dull and very little demand, with a prospect of least 30,000 tons to be placed upon this market before the first of May, future prices must be low.

COLD BLAST CHARCOAL—ALL NUMBERS.

Hanging Rock	$25@$28	Assorted Bar Iron	$2, rates.
Tennessee	26@ 30	No. 1 Wr'ght Scarp, 80c. cwt	
Kentucky	26@ 30	Heavy cast "	65c. "
Missouri	26@ 30	Light " "	55c. "
Georgia	26@ 30	Old rails	$19 00@$20 00
Alabama	26@ 30	Old carwheels	17 00@ 18 00

	No. 1.	No. 2.	Mill.	White and Mottl'd
Missouri stone coal	$22 00	$21 00	$20 00	$19 00
" charcoal	22 00	21 00	20 00	20 00
Tennessee charcoal	22 50	21 00	20 00	19 00
Tenn. coke very soft and strong	23 00	21 00	20 00	18 50
Hanging Rock charcoal	25 00	24 00	23 00	.....
" " cold short	24 00	23 00	.....	.....
	ExNo.1	No. 1.	B No.1.	No. 2.
Alice Hanging Rock coke.	$25 00	$24 50	$24 00	$22 50
Quinnimount, W. Va., coke.	23 50	23 00	22 00	21 00

METALS.

NEW YORK, Friday Evening, Feb. 8, 1878.

The market as a whole has been very quiet in all articles on this list. The unsettled political aspect of Europe is having its influence on trade, as is also the discrimination in freights against New York in favor of other cities.

Gold Coin.—During the week under review the price of gold has ranged from 101⅞ to 102⅛, closing at 102.

Bullion.—The market for silver abroad has been firmer this week in view of the pending legislation at Washington. The speculative rates prevailing, or asking here a week ago in view of the probable opening of the Philadelphia Mint to the coinage of trade dollars, have given place to the regular commercial rates since the decision of the Government not only not to open the Mint for this coinage, but even to restrict the coinage of the San Francisco Mint to export uses exclusively. We quote silver at $1.16¾ per oz. in this market, and 54d. in London. Gold bars are quoted at ⅛@¼ per cent. premium.

Daily Range of Silver in London and New York per oz.

DATE.	London	N. Y.	DATE.	London	N. Y.
	Pence.	Cents.		Pence.	Cents.
Feb. 2	53⅞	116-117	Feb. 6	54⅛@¼	116¾
Feb. 4	54	116½	Feb. 7	54⅜	116¾
Feb. 5	54	116½	Feb. 8	54	116⅝

UNITED STATES ASSAY OFFICE.—Statement of business for the month ending January 31, 1878:

Deposits of Gold—		$827,000 00
Deposits of Silver—		
Miscellaneous	$98,000 00	
Colorado	252,000 00	
Idaho	20,000 00	
Lake Superior	2,000 00	
Montana	36,000 00	
Nevada	6,000 00	
New Mexico	28,000 00	
Utah	10,000 00	452,000 00
Total Deposits		$1,279,000 00
Transmitted to Mint of the United States at Philadelphia for coinage, gold	831,651 38	

United States Mint Coinage for January.—WASHINGTON, Feb. 1.—Following is a statement of coinage executed at the United States mints in January, 1878:

	Pieces.	Value.
Gold coinage	122,300	$2,446,000
Trade dollars	1,391,300	1,391,300
Fractional silver	3,248,800	907,810
Minor coinage	1,131,200	11,336
Total	5,893,600	$4,756,446

BULLION SHIPMENTS.

Jan.	Day	Nev	$7,355.61
"	Leopard	"	4,870.56
" 17	Standard	Cal	22,019.67
" 15	Butte	Montana	45,161.68
"	Leeds	Utah	*10,000.00

* Average weekly output.

The Bullion Product of 28 Pacific Coast mines for the month of December, amounts to $4,670,900.

California Opinion of the Silver Bill.—The San Francisco Chamber of Commerce held a special meeting on the 4th inst. with regard to the proposed remonetization of the silver dollar, and a preamble and resolutions were adopted, and ordered to be telegraphed to the California delegation in Congress. The preamble recites the beneficial effect upon California of adhering to a coin basis during the fluctuations of the currency, and asserts that the recuperative energies of the act of Congress fixing resumption of specie payments for January 1, 1879, are rapidly bringing the currencies of the country to an equilibrium. It is therefore resolved:

"*First*—That we view with alarm the proposed passage of the Bland Silver bill, remonetizing the silver dollar of 412½ grains, and with it an unlimited silver clause, as a killing blow at the private and national faith and at the best interests of the country.

"*Second*—That we view the proposed repeal of the Resumption act as ill-advised and in the highest degree disastrous to the agricultural, manufacturing and commercial interests of the whole country, a step backward in our prosperity at home and our financial credit abroad.

"*Third*—That this chamber is opposed to any Congressional action that will increase to a legal tender the quantity of silver coin, or to the use of silver other than as a subsidiary coin."

Bullion product of the leading Pacific Coast mines for the calendar year 1877:

Belcher, Nev	$413,300	Leeds, Utah	327,700
California, Nev	18,924,900	M'Cr'ckin Con. A.	209,300
Challar-Potosi, N.	501,600	Manhattan, Nev.	945,400
C'd. Virginia, Nev	13,734,100	Modock Con. Cal.	569,100
Empire, Nev	177,800	New Coso Con. C'l	488,400
Empire, Sierra, C.	265,500	Northern Belle, N	1,454,200
Hite, Mariposa, C.	212,400	Ontario, Utah	1,758,800
Idaho, Nev., Cal.	515,700	Ophir, Nevada	158,400
Justice, Nevada	2,248,700	Tybo Con. Nev	827,600
Con. Eureka, Nev.	508,700		
Leopard, Nev	246,200	Total	$44,487,800

Silver Shipment to China.—SAN FRANCISCO, Feb. 7.—The treasure list of the City of Tokio, which sailed to-day for Hong Kong, *via* Yokohoma, was as follows: Mexicans, $137,990; trade dollars, $26,094; gold coin, $900; fine silver, $126,199. There were some large orders here for trade dollars, but the coin could not be obtained in time to fill them. The occurrence of the Chinese New-Year also stopped some business.

A Flood of Cheap Silver.—The New York *Tribune* of the 7th inst. says: "The Bank of France is about to issue $100,000,000 of legal tender silver and take up its 100-franc notes. Silver is at 11 per cent. discount. The merchants at Bordeaux are alarmed, and protest against the issue. In New York City merchants continue to be subjected to loss and annoyance by taking depreciated silver."

Copper.—The business of the past week has been confined to limited sales in small quantities at 17⅛@ 17⅝c. The market closes with 17⅛c. bid, and 17¾c. asked. There are no important features either in this market or that abroad, so far as the latter has been heard from.

Tin.—There is nothing but a fair jobbing business doing here. The quotations, in gold, per pound, are as follows: Straits, 14¾c.; L. & F., 14¾c.; Refined, nominal at 14¾@15c. The foreign prices reported are contradictory, but the impression is that there has been no particular change within a week.

Tin Plates.—There are no large sales of these reported. We quote, in gold, per box, as follows: Charcoal tins, $5.87½@$6.25, and ternes, $5.75@ $5.62½; coke tins, $5.37½, and ternes, $5.37½.

Messrs. Robert Crooks & Co., of Liverpool, under date of Jan. 24 say of tin and terne plates : "Trade this week has been mainly confined to coke tins, which are quickly bought up when offered at lowest rates. Still a good many holders have for some time preferred no business to meeting the market, and the almost certain ultimate giving way of these will probably make the lowest figure touched practicable for some time. For charcoals, tin and terne, and in coke ternes there is a very sluggish demand, but no quotable difference in prices."

Lead.—We note sales of 100 tons of double refined at 4c.; 100 tons of ordinary, for March and April delivery, at 4c., and sundry small lots at 3⅞@4c. The market closes very quiet at 3⅞@4c. in small lots, according to quality, while to dispose of a round lot a concession would probably have to be made. The smelters of pig lead in Southwest Missouri and Southeast Kansas held a meeting in Joplin on the 30th ult. and formed "The Southwestern Pig Lead Association." They have addressed a circular to the other smelters in the United States, apparently with the view of forming a combination; a thing quite impractical. A meeting is called to be held at the Lindell Hotel, St. Louis, on the first Thursday in March next.

Spelter and Zinc.—Spelter is very quiet at 5½c. Sheet zinc is no better, and is quoted in a jobbing way at 6½c.

Antimony.—Hallett's is scarce and quoted at 11⅞ @12c., gold. Cookson's is quoted at 12¼c.

Quicksilver.—The San Francisco *Commercial Herald*, of February 1, says:

"The export demand is light, and sales have been made this week at 42½c. At the close sales are reported chiefly for local use, of 4,000 flasks at 42@42½c., the market closing firm at latter rate. Receipts for the week are 362 flasks.

"Our exports by sea for January, 1877-8, are as follows:

	1877		1878	
	Flasks.	Value.	Flasks.	Value.
China	1,777	$68,719	340	$12,250
Mexico	326	12,471	650	22,338
Australia	100	3,836	30	1,215
Japan	21	815	150	5,300
New Zealand	15	574	10	329
Central America	20	765	....	....
Peru	370	14,140	850	28,210
Honolulu	1	38	...	.....
Chili	75	3,000	...	.....
Totals	2,705	$104,358	2,030	$69,642

Salt Lake Ore and Metal Market.

SALT LAKE CITY, Utah, Feb. 8, 1878.

Argentiferous Lead (*Base Bullion*), $31 per ton for lead; $1.15 per ounce for silver; $20 per ounce for gold. The quotations for silver are based upon the silver in the lead of 80 to 120 ounces per ton of 2,000 lb.

Report of Shipments of bullion and ore from Salt Lake City during week ending January 26:

BULLION.

Consignor.	Consignee.	Lb.	Total Lb.
Smelting Works.			
Mingo	Pennsylvania Co.	280,339	.....
Waterman	"	167,150	447,489
Morgan	Omaha Co.	87,988	.....
Pascoe	"	63,401	.....
Durell	"	20,872	.....
Waterman,	"	21,399	193,660
Germania	St. Louis Co.	.....	88,832
"	Hagen & Billings, N.Y	.....	82,512
Total			$812,493

ORE.

Consignee.	Consignor.	Lb.	Total Lb.
Conklin Sampl. W.	Hilliard S. W.	31,016	.....
Sailor Jack Mine	" "	147,000	.....
Emma Mine	" "	22,000	200,016
Copper-silver ore from Montana	Wyandotte, Mich. S W	.....	19,336
Total			219,352

The *Inter-Ocean's* correspondent, under date of January 31, says: "There are no buyers of bullion in market, and business, in consequence, is exceedingly dull. Nominal prices, $31 for lead and $1.15 for silver Professor Holden has invited, or intends to invite, the Legislature to visit his mine (The Old Telegraph), and, if possible, induce an exemption from taxation of all mining property. We are making some in leeching our low-grade ores. So far we are doing it at a loss of lead, but we hope in time to save it all. This is a very important discovery and will help us very much indeed. The Flagstaff and the South Star and Titus mine suit is still under argument before the Supreme Court, and much interest is manifested to know the decision, as it is one of great importance to the mining interest."

FINANCIAL.

New York Stocks.

NEW YORK, Friday Evening, Feb. 8, 1878.

Coal shares on this market close to-day at the lowest point of the week. The market has been comparatively quiet during the operations of the week, the total transactions amounting to about 63,000 shares. The most conspicuous stock in the downward movement is Delaware & Hudson, which closes at 47½ as against 49¾ a week ago. Delaware, Lackawanna & Western closed at 49¼, with sales of 45,883 shares.

Central, of New Jersey.—Messrs. Satherthwaite's London circular gives the following net earnings for eight months, Jan. 1 to Aug. 31, and further estimates to Nov. 1 for 1877:

	1876.	1877.
Net earnings	$1,279,697	$1,210,008
Add September	.....	131,664
Add October (estimated)	.....	185,000
Total net earnigs to Oct. 31,'77.	.....	$1,526,672

This stock closes at 17¾ against 17 as reported in our last; the sales for the week aggregate 6,482 shares.

The dealings in the bonds of this Company during the week have been very large, aggregating over $100,000.

Highland Coal Co.—The annual meeting of this company will be held Feb. 13.

Excelsior Coal Mining Co.—This company will hold its annual meeting Feb. 13.

Rockhill Iron Co.—The annual meeting of this company takes place Feb. 19.

Union Pacific R. R. Co.—The annual meeting of this company for the election of directors, etc., will be held Feb. 25.

Philadelphia Stocks.

PHILADELPHIA, Friday Evening, Feb. 8, 1878.

The coal stocks dealt in on this market close, without exception, at a slight decline on the prevailing prices of the previous week. The total sales amount to about 50,000 shares, of which nearly 35,000 shares were sales in the stock of the Pennsylvania Railroad Company, the closing price being $29½ against $30 per share a week ago; these prices represent the extreme quotations in this stock for the week. About 10,000 shares of Reading have changed hands at nearly uniform prices. Lehigh Valley and Lehigh Coal & Navigation present no special features, having been sparingly dealt in, with scarcely any variation in the quotations.

Huntingdon & Broad Top Railroad.—The annual meeting of the Huntingdon & Broad Top Railroad Company was held on the 5th inst., on Walnut street, Philadelphia. The annual report was read, showing receipts during the year 1877 of $261,410.25, and expenses of $151,333.02, leaving net earnings of $110,077.23. The number of passengers carried in 1877 was 47,362. The number of tons of freight moved was 388,396, of which 140,143 tons were Broad Top coal, and 187,488 were Cumberland coal, the whole tonnage being 5,760 tons less than in 1876.

AUCTION SALES.—During the week the following stocks and bonds were disposed of at auction:

Pennsylvania R. R. Co.—100 shares at $30 per share.

Philadelphia & Reading R. R. Co.—$3,000 7 per cent. conv. bonds, due 1893, at 54 per cent.

Emaus Iron Co.—2,000 7 per cent. first mortgage bonds endorsed by Philadelphia & R. R. R. Co., at 50 per cent.

Philadelphia & Reading C. & G. Co.—$3,000 purchase money mortgage 6 per cent. registered Chandler Coal and Mining Co. Tract at 43 per cent.

Florence Iron Works, N. J.—750 shares at $15 per share.

Miscellaneous Sales and Quotations.

Sales and quotations of the stocks and bonds dealt in here, at Philadelphia and Baltimore for the week ending the 8th inst. are given in the following tables. The Philadelphia quotations will have a * affixed. The Baltimore quotations are indicated thus †.

STOCKS.	Par Value.	High'st	Lowest	Closing	Sales: Shares.
American Coal Co.	$25	32	.....	31	300
St.L.,I.M.& S.R.Co..	100	.....	.....	5⅛	.....
Spring Mt. Coal Co.	50	.....	.....	35	.....
*Cambria Iron Co.	50	.....	.....	51	.....
*Penn. Salt Mf'g Co.	50	.....	.....	68	.....
*Westm'land C. Co.	50	.....	.....	65	.....
*Buck Mt. Coal Co.	50	.....	.....	30	.....
*Schuyl. Nav. Co.	50	.....	.....	.....	.....
†Balt.& O.RR.Co.pf	100	.....	.....	86	.....
" " " " com	100	88	87	.....	76
†George's C'k C. Co	100	.....	.....	.....	.....
†S. Clara M'g Co..	100	.....	.....	.....	.....
†Atlantic Coal Co.	10	.....	.....	1.30	.....

BONDS.	Princ'l. When Due.	Int'est. When Due.	Hig'st.	Lowest	Amount.
D., L. & W., 7s, conv	1892	J. & D.	.....	.....	.....
" " " " 2d mtge.	1881	M. & S.	107½	107	$18,000
N.J.C.,1stmtge.new	1890	F. & A.	111	110⅝	27,000
" " " 1st mtge.,con	1899	Q.	68⅝	65½	62,000
" " " convt	1902	M. & N.	67½	63	21,000
Lehigh & W. B., con	1899	Q.	39½	37	26,000
Am. Dock & Imp. 7s	.....	J. & J.	44	.....	1,000
St.L.I.M.& S.,1st mt	1892	F. & A.	104	103¾	5,000
Ches. & O., 1st mtge	1899	M. & N.	.....	.....	.....
D & H C Co.,1stm.rg	1884	J. & J.	.....	.....	.....
" " " " " "	1891	J. & J.	.....	.....	.....
" " " " m.loan cp	1894	A. & O.	95¼	95	3,000
" " " " " rg.	1894	A. & O.	97	.....	1,000
" " " " new mge.	.....	.....	.....	.....	.....
*L.V.R.,1stm.6s.cp.	1898	J. & D.	.....	.....	.....
" " " rg.	1898	J. & D.	.....	109¼	.....
" " " 2d m. 7s,rg.	1910	M. & S.	.....	.....	.....
" " " con.m.6s,rg	1823	J. & D.	96	.....	7,000
" " " 6s cp.	1923	J. & D.	.....	96	.....
*Pa.RR.,1st m.6s,cp	1880	J. & J.	105¼	.....	1,000
" " g.m., 6s, cp.	1910	J. & J.	107¼	.....	14,000
" " " 6s, rg.	1910	A. & O.	.....	109	.....
" " con.m.6s,rg.	1905	Q.	.....	92½	.....
" " " 6s, cp.	1905	J. & D.	.....	.....	.....
" " new loan, 5s	.....	.....	111	110¾	15,700
*P.& R. R., 1st m.6s, R. C. 43-44	1880	J. & J.	.....	112	.....
P. & R. R., 1st m. 6s, R. C. 48-49	1880	J. & J	112	.....	3,000
P.& R. R.,2d m.7s cp	1893	A. & O.	.....	.....	.....
" " " scrip	1882	J. & J.	64¾	64¼	7,875
" " " in.m.7s,cp	1896	J. & D.	64¾	64	6,000
" " " c.m.7s,cp.	1911	J. & D.	101¾	101⅛	10,000
" " " " 7s. rg.	1911	J. & D.	101¾	.....	2,000
" " " cvt.7s,R.C	1893	J. & J.	.....	52	.....
" " C.& I.Co.,Deb 7s, R. C.	1892	M. & S.	.....	.....	.....
P. & R.C.& I. Co., m. 7s, R. C.	'92-3	various	104½	.....	200
L. Nav. Co.,6s,rg.m.	1884	J. & Q.	.....	.....	.....
" " " RR., rg. m.	1897	F. & Q.	104	.....	2,000
" " " cvt. co. G. R.	1894	M. & S.	.....	.....	.....
" " " Gold R. C.	1897	J. & D.	88⅛	88	9,000
" " con.m.7s,rg.	1911	J. & D.	.....	.....	.....
*P.& N.Y.C.,7s,R.C.	1896 / 1906	J. & D.	112½	.....	1,000
*Pa. Canal, 6s. cp..	1910	J. & J.	.....	.....	.....
*Schuyl.Nav.,1st m. 6s. rg	1897	M. & Q.	.....	91	.....
*Sus.Coal, 6s, rg..	1911	J. & J.	.....	68	.....
†Balt.&O. RR., 6s..	1880	J. & J.	101½	.....	2,500
" " " " 6s..	1885	A. & O.	.....	105	.....
Total transactions for the week					$245,275

Copper Stocks.

Reported by Wilson W. Fay & Co., Brokers in Mining and Miscellaneous Stocks, Room 7, Traveller Building, 31 State street.

BOSTON, Wednesday Evening, February 6, 1878.

The market has been active the past week, most of the stocks having more or less transactions, and the majority having an upward tendency, which is helped along by outside orders to some extent, and also by the bulls, to whom the rise is very refreshing after such a long period of falling prices.

Predictions of another lively market in "coppers" are rife on the street, and appearances at present indicate that there is a fair probability of their proving true.

Calumet & Hecla is still advancing, and closes this evening at 176 bid and 176½ asked, and sales at 176.

Copper Falls has risen steadily since last week, the bulls showing an evident disposition to help it up, and most of the holders waiting for higher prices. The stock has sold up to 3½ and closes 3⅝@3¾.

Franklin retains its usual quietude.

Osceola has declined about 4 per cent., without any apparent cause, save the sale of 50 or 75 shares.

The closing price is 9¾ bid, and 10¼ asked.

Pewabic is a little firmer, although rather quiet, closing 1⅞@2

Quincy is firm, having advanced to 36, and sold at that figure and declining again to 35½@35¾, and closing firm.

Ridge declined a trifle and sold at 1¼, but is firmer now at 1⅛@1⅝.

Duncan went as high as $3, but did not seem to be able to get beyond that figure, there being large lots of stock offered at $3, that seeming to be the limit of the majority of the sellers. It has declined to 2¼ bid and 2¾ asked, and closed rather weak.

International is also rather weak, closing, 30 bid and 33 asked.

Merrimac Silver (old stock) closes $3@$3.25.

The Schuylkill coal trade is absolutely bottled up at tidewater by the high tolls, and will continue so until the spring rates are established. The city and line trade combined, dull, and very few collieries could run at all but for the furnaces securing an extra supply to carry them through the stoppage of two weeks which is to begin next Monday.

Hilton Copper Mining Co., Lake Superior.—The Ontonagon *Miner* says: "This company has declared a dividend of $15,000 or 75 cents per share on their capital stock. This is encouraging, from a mine that has been lying idle for several years, and we wish some more of them in Ontonagon would do the same. The dividend is to be paid from money, and interest accumulated that has been lying in the treasury ever since the mine stopped work seven or eight years ago.

Annual meetings of Lake Superior Copper Mining Companies will be held on the dates mentioned below:

Name of Company.	Date of meeting.	Name of Company.	Date of meeting.
Adventure	March 7	Lake Superior	March 7
Allouez	March 12	Mesnard	March 26
Atlantic	March 12	Minnesota	March 20
Atlas	March 4	Osceola	March 14
Central	April 3	Petherick	March 19
Evergreen Bluff	March 20	Pewabic	March 27
Eagle Harbor	March 12	Phœnix	March 18
Franklin	April 17	Quincy	March 6
Flint Steel	April 2	Ridge	March 7
Hilton	March 12	Rockland	April 9
Humboldt	March 28	Superior	April 9
Isle Royal	March 13	Seneca	March 25

Gold and Silver Stocks.

NEW YORK, Friday Evening, Feb. 8, 1878.

The business at the American Mining Exchange has attracted a vast amount of attention during the past two weeks, and upon the floor of the Exchange has been observed great activity. The business does not wear that "washed" appearance that prevailed so much up to the end of 1877, yet it is the wildest of speculation, in most instances in the least deserving of our mines—those not paying dividends nor giving satisfactory evidence of an intention to do so. The total sales for the week under review have been 290,605 shares. Of this amount, Bertha & Edith sold to the extent of 133,775 shares, at 13@23c., closing at 19c.; American Flag, 47,400 shares, at 11@24c., closing at 23c.; Lacrosse, 77,450 shares, at 40@75c., closing at 71c.

The other stocks attracting attention have been: American Consolidated, with sales of 2,400 shares at $11@$10; Hukill, 1,600, at $4.85@$5½; Moose, 13,600 shares, at $8⅛@$7⅛; New York & Colorado, 4,160 shares, at $2@$2.90; Seaton, 2,700, at $2.55@$2.90; Ontario, 1,245, at $30½@32.

As an evidence of the interest that is being taken in mining investments, it may be noted that seats which were held at $125@$150 at the opening of the year have sold this week at $350, and $400 is now bid. On the regular stock exchange the railroad and other stocks have been held by strong operators and cliques since last summer, and every effort on the part of the ordinary speculators to do business there has resulted disastrously. The result of this is to direct speculation to other channels and leave the cliques and capitalists with the "good things" they try to make the public believe they hold. Should the interest now manifested continue or increase, we are likely to see suitable facilities for making transfers of all of our prominent dividend stocks and in addition have added to the list numerous very worthy mines that are not now represented in any exchange. There were several good mines bought here last year, but as the business of the mining exchange bore at that time a very unhealthy appearance their entrance on the list was not sought.

The stock of the Ontario Silver Mining Company is gradually advancing, and closes to-day at the highest point yet attained, viz.: $32 per share; the sales for the week aggregate 1,245 shares. The bullion product of this company for the month of January was 86 bars, having an assay value of $170,265.74. The company has declared a dividend of 50c., gold, per share, payable on the 15th inst., and also an extra dividend of the same amount, payable on the same date, making the twentieth dividend paid by the company.

SAN FRANCISCO MINING STOCK QUOTATIONS.

Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS. Feb. 2.	Feb. 4.	Feb. 5.	Feb. 6.	Feb. 7.	Opening Feb. 8.
Alpha	11½	10	11	10½	10¾	11
Belcher	5¼	4¾	4	5	5	5
Best & Belcher	18¼	18	18	18	17¾	18
Bullion	4¼	4½	4½	4½	4	.....
Caledonia	2¾	.....	3	2¾	2¾	.....
California	27¾	27¾	28	28¼	28¼	28
Chollar-Potosi	32	32	32¼	32	33	33
Con. Imperial	1	1	1	1	1	.....
Con. Virginia	23¼	23¼	23¼	23¼	23¼	23½
Confidence	5½	5	4¾	5	5	.....
Crown Point	5¼	5	5¼	5	5	5
Eureka Con	37½	38¾	38¾	39	39	39
Exchequer	2¾	2¾	3	2¾	2¼	.....
Gould & Curry	8¾	8½	8½	8½	8½	8½
Grand Prize	13½	13¼	13¼	13¼	13¼	.....
Hale & Norcross	10¾	10¾	10¾	10½	9¾	9¾
Julia	1¾	2	2	2	2¼	.....
Justice	11¾	11¼	11¾	11¼	10	10
Kentuck	4½	4¼	4¼	4¼	4	4
Mexican	13½	13½	13¾	14¼	13¾	13¼
Northern Belle	10¼	10¼	10¾	10¾	10¼	.....
Ophir	52¾	51¾	53¾	55¼	53¾	53
Overman	17¼	16¾	17	16	15	15
Raymond & Ely	6¾	6	4¾	6	5¾	5½
Silver Hill	2¼	2½	2½	2¾	2¾	.....
Savage	12¾	12¾	12½	12½	12	12
Seg. Belcher	30	30	30	30	30	.....
Sierra Nevada	4	4¼	4½	4¾	4½	4¾
Union Con	6¼	6	6¼	6	6¼	6
Yellow Jacket	10¾	10¼	10¾	11¼	10¾	10½

The San Francisco *Commercial Herald* of January 31 says of the market: "Under a decreased amount of business the past week mining stocks have been well maintained, and in many instances an improvement has been

COAL TRANSPORTATION AND GENERAL MINING STOCKS.

COAL STOCKS.

NAME AND LOCATION OF COMPANY.		Feet on Vein.	Capital Stock.	SHARES. No.	SHARES. Par Val.	ASSESSMENTS. Total levi'd to date.	ASSESSMENTS. Date and amount per share of last. Mo.	Yr.	Amt.	DIVIDENDS. Total paid to date.	Last Dividend. Mo.	Yr.	Amt.	Rate per Ann.	HIGHEST AND LOWEST PRICES PER SHARE IN CURRENCY AT WHICH SALES WERE MADE. N. B.—Quotations of D., L. & W. R. R., and Pa. Coal Co. are per $100—two shares. Feb. 2. H.	Feb. 2. L.	Feb. 4. H.	Feb. 4. L.	Feb. 5. H.	Feb. 5. L.	Feb. 6. H.	Feb. 6. L.	Feb. 7. H.	Feb. 7. L.	Feb. 8. H.	Feb. 8. L.	SALES.
			$		$					$				Per c'nt													
Consol. Coal	Md.		10,250,000	102,500	$100	*					Jan.	1877	2½														
Del. & H. Canal	Pa.		20,000,000	200,000	100	*				38,821,104	Aug.	1876	4	9	49⅜	49¾	49¾	49⅛	49¾	47½	48⅝	48	48½	47⅛	48½	47⅛	11,356
Del., Lac. & W. R. R.	Pa.		26,200,000	524,000	250	*					July	1876	2½	5	50⅜	50¼	50½	50¼	50⅜	50¼	50¼	49⅞	50½	49⅜	49¾	49¼	45,883
Lehigh C. & Nav.	Pa.		10,448,550	208,971	50	*					Nov.	1876	1½	5½	18¼	18¼	....	....	18⅜	18¼	18¼	17⅝	17⅞	17⅜	17½	17⅛	3,400
Lehigh Valley R. R.	Pa.		27,042,900	540,858	50	*									40	40	40	40	40	39⅜	39⅜	39¼	39⅜	38⅜	39¼	38¾	1,751
Maryland Coal	Md.		4,400,000	44,000	100	*					Jan.	1876	1½	1½	....	....	....	....	....	....	....	....	....	....	....	....	
N. J. Central R. R.	Pa.		20,000,000	200,000	100	*					Apr.	1876	2½	2½	17½	17¼	17⅛	17⅛	18¼	17⅛	17⅛	17⅜	17¾	17¼	17¼	17¾	6,482
Pennsylvania Coal	Pa.		5,000,000	100,000	50	*					Feb.	1878	3		....	....	....	....	....	....	....	....	....	....	....	....	
Pennsylvania R. R.	Pa.		68,870,200	1,337,404	50	*					May	1877	1¼	8	30	29¾	30	29¾	30	29¾	30	29½	29¾	29¼	29⅝	29½	34,837
Phil. & Read. R. R.	Pa.		34,278,175	685,563	50	*				43,012,497	Jan.	1876	2½+	10	15¾	15¾	16	15¾	15⅝	15¾	15¾	15½	15⅝	15½	15⅝	15½	9,983

GENERAL MINING STOCKS.

Dividend Paying Mines.

American	Col.		1,000,000	100,000	10	*				30,000	Feb.	1878	$0 10	12	10¾	10¾	11	10¼	....	....	....	....	10¼	10	10	....	2,400
Belcher, g. s.	Nev.	1,040	10,400,000	104,000	100	1,176,400	Dec.	1877	1 00	15,397,200	Apr.	1876	1 00	12	....	....	....	....	....	....	....	....	....	....	....	....	....
Bobtail, g.	Col.	2,500	1,186,630	227,326	5	*				50,831	Nov.	1877		25	....	....	....	....	....	....	....	....	....	....	....	....	....
Bobtail Tunnel, g.	Col.		100,000	20,000	5	52,000	July	1873	0 30	40,000	Dec.	1877		50	20	....	....	....	....	....	....	....	....	....	....	....	....
California, g. s.	Nev.	600	54,000,000	540,000	100					22,680,000	Jan.	1878	2 00	24	....	....	....	....	....	....	....	....	....	....	....	....	....
Calumet & Hecla, c.	Mch		2,000,000	80,000	25	1,200,000				12,250,000	Oct.	1877	5 00	20	....	....	....	....	....	....	....	....	....	....	....	....	....
Central, c.	Mch		500,000	20,000	25	100,000	June	1862	0 65	1,260,000	Feb.	1878	5 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Cholla Potosi, g. s.	Nev.	1,400	2,800,000	28,000	100	1,573,000	Jan.	1878	3 00	3,080,000	Feb.	1872	1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Copper Falls, c.	Mch		1,000,000	20,000	50	535,000	May	1876	....	100,000	Nov.	1871	1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Cons. Virginia, g. s.	Nev.	710	54,000,000	540,000	100	474,600	June	1873	3 00	36,720,000	Jan.	1878	2 00	24	....	....	....	....	....	....	....	....	25¼	25	....	....	15
Confidence, g. s.	Nev.	130	2,496,000	24,960	100	243,840	Mar.	1873	1 00	78,000	May	1865	8½	8½	....	....	....	....	....	....	....	....	....	....	....	....	....
Cons. Her. & Roe.	Col.	16,500	1,000,000	100,000	10	*				120,000					....	....	....	....	....	....	....	....	....	....	....	....	....
Crown Point, g. s.	Nev.	600	10,000,000	100,000	100	1,673,370	Jan.	1878	1 00	11,588,000	Jan.	1875	2 00	24	5	....	....	....	....	....	....	....	....	....	....	....	15
Eureka Cons., g. s. L.	Nev.		5,000,000	50,000	100	100,000	May	1876	1 00	1,450,000	Jan.	1878	3 00	24	....	....	....	....	....	....	....	....	....	....	....	....	....
Eureka G. Mg., g.	Cal.	1,680	2,000,000	20,000	100					2,134,000	Aug.	1877	2 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Franklin, c.	Mch		500,000	20,000	25	360,000	June	1876	5 00	585,000	Nov.	1871	1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Gould & Curry, g. s.	Nev.	612	10,800,000	108,000	100	2,558,000	Dec.	1877	1 00	3,826,800	Oct.	1870	10 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Grand Prize	Nev.									1,200,000	Jan.	1878	1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Hale & Norcross, g. s.	Nev.	400	11,200,000	112,000	100	2,746,000	Dec.	1877	1 00	1,598,000	Apr.	1871	5 00	12	....	....	....	....	....	....	....	....	....	....	....	....	....
Hukill, g. s.	Col.	3,288	1,000,000	100,000	10	*				130,000	Feb.	1878	0 10	12	.95	4.90	....	....	5⅛	4.85	5	4.85	4.95	....	....	....	1,600
Kentuck, g. s.	Nev.	95	3,000,000	30,000	100	270,000	Dec.	1874	1 00	1,252,000	Mar.	1870	5 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Leopard, L. g. s.	Nev.	1,500	5,000,000	50,000	100	100,000	July.	1877	50	162,500	Dec.	1876	0 50	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Merrimac, s.	Mas.	1,500	500,000	50,000	10	*				110,000	Jan.	1878	0 10	12	....	....	4¼	....	4.15	....	....	....	4	....	3½	....	600
Minnesota, c.	Mch.		1,000,000	20,000	50	436,000	June	1869	1 00	1,820,000	Mar.	1876	0 50	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Moose.	Col.	39,000	2,000,000	200,000	10	*				175,000	Jan.	1878	0 25	10	8⅛	8	8	7¾	8	7½	7⅞	7¾	7¾	7½	7¾	7⅝	13,600
National, c.	Mch.		500,000	20,000	25	195,000	Oct.	1875	1 00	360,000	Oct.	1873	1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....
N. Y. & Colorado, g.	Col.		1,000,000	50,000	20	*				20,000	Mar.	1877	0 20	....	....	....	2	....	2.70	2.05	3	2.55	2.80	2.60	2.90	2¾	4,160
Northern Belle, s.	Nev.	1,600	5,000,000	50,000	100					1,400,000	Oct.	1877	1 00	....	11¼	....	....	....	....	....	....	....	....	....	....	....	25
Ontario.	Uth.	3,000	10,000,000	100,000	100					900,000	Jan.	1878	0 50	6	31	....	31½	30⅝	31½	....	31¾	31½	31¾	....	32	....	1,245
Ophir, g. s.	Nev.	675	10,080,000	100,800	100	3,035,200	Jan.	1878	1 00	1,394,400	Mar.	1864	4 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Pewabic, c.	Mch.		500,000	20,000	25	185,000	June	1868	3 00	460,000	July	1873	1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Phœnix, c.	Mch.		1,000,000	20,000	50	817,500	Sept.	1870	3 00	20,000	Jan.	1876	1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Quincy, c.	Mch.		200,000	20,000	10					2,130,000	Feb.	1877	4 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Raymond & Ely, g. s.	Nev.	5,000	3,000,000	30,000	100	540,000	Dec.	1876	1 00	3,075,000	Sept.	1873	3 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Ridge, c.	Mch.		500,000	20,000	25	200,000				90,000	Feb.	1875	1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Rye Patch	Nev.	3,000				97,500	Nov.	1876	0 50	150,000	Dec.	1877	0 25	....	....	....	....	....	....	....	....	....	....	....	....	....	....
St. Joseph, L.	Mo.	2,000 acs.	1,000,000	100,000	10					250,000				....	....	....	....	....	....	....	....	....	....	....	....	....	....
Savage, g. s.	Nev.	800	11,200,000	112,000	100	3,650,500	Jan.	1878	1 00	4,460,000	June	1869	3 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Seaton, g. s.	Col.	1,700	500,000	50,000	10	*				10,000	May	1877	0 10	12	2.60	2.55	2.60	2.55	2.55	....	2.60	2.55	2.80	2.70	2.90	2.60	2,700
Sierra Nevada, g. s.	Nev.	3,650	10,000,000	100,000	100	1,000,000	Jan.	1878	0 50	102,000	Jan.	1871	1 00	10	....	....	....	....	....	....	....	....	5	....	....	....	25
Silver King										150,000	Jan.	1878	0 50	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Standard.	Cal.									250,000	Jan.	1878	1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Yellow Jacket, g. s.	Nev.	1,200	12,000,000	120,000	100	3,438,000	Jan.	1878	2 00	2,184,000	Aug.	1871	2 50	....	....	....	....	....	....	....	....	....	....	....	....	....	....

Non-Dividend Mines.

Allouez, c.	Mch.		1,000,000	20,000	50	940,000	May	1876	5 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Alpha, g. s.	Nev.	300	3,000,000	3,000	100	210,000	Aug.	1877	1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Am. Flag, g.	Col.	5,300	600,000	60,000	10	*				....	....	....	....	....	17c	11c	20c	15c	18c	15c	17c	16c	18c	16c	24	16c	47,400
Bertha & Edith. g.	Vir.	645 acs.	3,500,000	350,000	10	*				....	....	....	....	....	17c	13c	17c	14c	20c	15c	21c	16c	23c	18c	20c	18c	133,775
Best & Belcher, g. s.	Nev.	545	10,080,000	100,800	100	337,792	Aug.	1877	1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Bullion, g. s.	Nev.	943½	10,000,000	100,000	100	2,802,000	Jan.	1878	1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Caledonia, g. s.	Nev.	2,158	10,000,000	100,000	100	1,435,000	Oct.	1877	0 75	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Cleveland, g.	Col.	3,715	250,000	25,000	10	*				....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Cons. Imperial, g. s.	Nev.	468	50,000,000	500,000	100	575,000	Oct.	1877	0 20	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Con. N. Slope & E. C.T.	Col.	15,000	500,000	10,000	50	*				....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Dana, c.	Mch.		500,000	20,000	25	68,000	Jan.	1863	0 50	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Dawson, s.	Ont.		1,200,000	60,000	20					....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Duncan, s.	Ont.		1,200,000	60,000	20	75,000	July	1876	4¼	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Exchequer, g. s.	Nev.	400	10,000,000	100,000	100	380,000	Jan.	1878	1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Granville, g.	N. C.	9,000	1,000,000	100,000	10	*			0 50	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Humboldt, c.	Mch.		500,000	20,000	25	100,000	Sept	1876	0 15	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
International, s.	Ont.		1,200,000	60,000	20					....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Julia, g. s.	Nev.	3,000	11,000,000	110,000	100	525,000	Jan.	1878	0 75	....	....	....	....	....	½	....	....	....	....	....	....	....	....	....	....	....	100
Justice, g. s.	Nev.	2,100	10,500,000	105,000	100	2,237,500	Jan.	1878	2 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Kings Mountain, g.	N. C.		1,200,000	120,000	10	*				....	....	....	....	....	3.45	3.35	3.35	....	3.30	....	3.20	....	3.20	3.15	3.20	....	3,400
Lacrosse.	Col.	3,900	1,000,000	100,000	10	*				....	....	....	....	....	45c	40c	53c	41c	63c	52c	75c	64c	72c	61 c	69c	64	77,450
Lucerne.	Col.	4,200	5,000,000	500,000	10	*				....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Madison, c.	Mch.		500,000	20,000	25	123,000	Sept	1876	0 10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Mariposa preferred.	Cal.	44,387	5,000,000	50,000	100	1,425,000	June	1877	1 00	....	....	....	....	....	....	....	1¼	....	1⅛	....	1¼	85c	....	....	....	....	1,000
" common	Cal.	acres.	10,000,000	100,000	100	1,425,000	June	1877	1 00	....	....	....	....	....	....	....	....	....	1	....	1.20	....	....	....	....	....	100
Memphis.	Col.	6,000	300,000	60,000	5	*				....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Mesnard, c.	Mch.		500,000	20,000	25	160,000	Apr.	1876	0 50	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Mexican, g. s.	Nev.	600	10,080,000	100,800	100	181,440	Aug.	1877	0 30	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Overman, g. s.	Mch.		1,000,000	40,000	25	880,000	May.	1878	2 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Osceola, c.	Nev.	1,200	3,840,000	38,400	100	2,567,880	Nov.	1877	3 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Petherick, c.	Mch.		500,000	20,000	25	165,533	Mar.	1876	0 50	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Pleasant View, g.	Col.	1,200	200,000	20,000	10	*				....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Quicksilver preferred.	Cal.	8,500	4,291,300			*				....	....	....	....	....	....	....	....	....	23¾	....	....	....	....	....	....	....	300
" common.	Cal.	acres.	5,708,700	100,000	100					....	....	....	....	....	....	....	16	....	16¼	....	....	....	17⅜	17	....	....	700
Rockland, c.	Mch		500,000	20,000	25	495,000	Jan.	1874	1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Seg. Belcher, g. s.	Nev.	160	640,000	6,400	100	244,800	Apr.	1876	5 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Silver City, g. s.	Nev.	3,900	6,310,000	63,100	100	15,775	Nov.	1875	0 25	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Silver Hill, g. s.	Nev.	5,400	5,400,000	54,000	100	192,600	Dec.	1877	1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Star, c.	Mch.		500,000	20,000	25	265,000	Mar.	1876	0 50	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Superior, c.	Mch.		500,000	20,000	25	340,000	Mar.	1874	0 25	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Union Cons. g. s.	Nev.	850	10,000,000	100,000	100	285,000	Oct.	1877	0 25	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

g. Gold. s. Silver. L. Lead. c. Copper. * Non-Assessable.

Total Assessment levied to date..... 47,829,330
Total Mining Dividends to date..... 214,842,832

Total Sales of Coal Stocks for the week..... 113,692 shares.
Total Sales of Mining Shares for the week..... 290,605 "

†A dividend of 3⅛ per cent. was declared on the preferred stock of this Co. in July.

noted, showing a degree of firmness not expected at the present time. Everybody predicted that we would have a very depressed market toward the close of January, but instead we have an evenness that is surprising. Shares are evidently not being forced on the market, as the reduced aggregate transactions would indicate, being upward of $800,000 less than last week.

The ore from the California mine comes mostly from the 1,550, 1,600, and 1,650 levels. On the 1,750 level they passed through low grade ore. The material passed through on the 1,850 level the past week has been quartz, clay and porphyry, and is of no value. The bullion yield to date for the current month amounts to $1,034,274. The various ore-producing levels of the Consolidated Virginia are without any important change. The new ore development on the 1,750 level is about to be sufficiently opened to admit of at least a guess being made as to its real value and extent. The bullion product for the fiscal month so far aggregates $884,950. The east crosscut in Ophir on the 1,700 level is now in 279 feet, showing a heavy body of clay, quarts and porphyry in the face of the drift, giving low assays. The main incline, now below the 1,900 level, is passing through hard blasting rock.

Bonanza Dividends.—The Consolidated Virginia and the California Mining Companies have each declared their regular monthly dividends of $2 per share from the January product.

A San Francisco dispatch to Kiernan's News Bureau reports that "suits have been instituted against the California and Virginia Consolidated mines, by parties claiming ownership, to recover possession and profits."

The Idaho Gold Mine, of Grass Valley, California, has declared a dividend of $7.50 per share.

Belcher Mining Co—The annual meeting of the stockholders of this company was held in San Francisco on the 29th of January. The financial statement of the mine was briefly given as follows: The mine was in debt at the last annual meeting, $88,000. Since then it has produced $414,000 in bullion, $407,000 from assessments, and $77,000 was paid to it by Crown Point on joint shaft account. The disbursements have been all the above, or $986,000, and $48,000 besides, the last sum being the amount the company is in debt now to the Bank of California.

Chicago Mining Stock Exchange.—The formation of this organization is progressing satisfactorily, and it is anticipated that the corporation will be completed by the 11th inst.

The San Francisco Stock Exchange has declared a dividend of $500 per seat.

The Leeds Mine (*Utah*) has declared a dividend of 20 per cent. per share.

Assessments, with dates when delinquent: Crown Point, $1, March 5; Alpine, 10 cents, Feb. 28; Enterprise, 10 cents. March 2; Young America, 15 cents, Feb. 26; New England, 10 cents, Feb. 26; Woodville Consolidated, 25 cents, Feb. 25; Rough-and-Ready, 10 cents, Feb. 28.

Sutro Tunnel.—The Gold Hill *News* of the 31st of January, says of the progress of this work: "Total length of tunnel last evening, 18,819. The face of the header is now in soft vein material, consisting of decomposed porphyry, quartz and clay, requiring extra close and careful timbering, as this material is very liable to cave, if not substantially secured."

Gas Stocks.

NEW YORK, Friday Evening, Feb. 8, 1878.

We have no transactions in gas stocks to report. The market is dull, and we note a few quotations slightly lower.

Report of the Trustees of the Philadelphia Gas Trust for 1877.—We extract the following from the forty-third annual report of the operations of the Philadelphia Gas Trust during the past year, as submitted to the Philadelphia Common Council on the 4th inst:

Since the last annual report there have been expended:

For works	$625,238 59
For mains	182,095 19
For services	68,721 14
Making a total of	$876,054 92
From which deduct amount received on account of mains and services	21,378 37
Leaving a balance of	$854,676 55

The quantity of gas manufactured during the year 1877 was 2,110,677,000 cubic feet, this being a decrease of 43,604,000 cubic feet from last year. The largest consumption in any twenty-four hours was on the night of the 24th of December, amounting to 9,319,000 cubic feet, being an increase over the largest of last year of 525,000 cubic feet.

The street mains laid during the year were 84,530 feet, making the entire length of the mains 690½ miles.

The whole number of lamps on the 1st of January of this year was 11,738, of which 11,260 were supplied with gas from these works, and 478 with gas from the Northern Liberties Works.

The cashier's report, herewith submitted, shows that the loans created by Councils, from time to time, for the construction of the works, their increase and manufacturing capacity, the extension of mains and for the purchase of other works, amounted to $7,370,000. The amount paid from the sinking funds for loans 1, 2, 3, 4 5, 6, 7 and 8, as they became due, was $1,370,000, leaving in the sinking fund, in charge of the trust for the payment of loan No. 9, $1,565,504.37.

The amount of loans and cash in the hands of the commissioners of the sinking funds of the city for the redemption of loans 10, 11, 12, 13, 14, 15 and 16 is $1,499,137.31.

The amount of loans unpaid on the 31st of December, 1877, was $6,000,000, from which deduct the amount of loans and cash in the charge of the trustees and commissioners of the sinking funds, $3,064,641.68, leaving a balance to be provided for amounting to $2,935,358.32.

The amount of loans and cash in the hands of the City Treasurer for the payment of $450,000 city loans (being the estimated value of the Spring Garden, Moyamensing, West Philadelphia and Frankford Gas Works) is $449,402.61.

For the purchase of the Southwark and Moyamensing, Germantown, Manayunk and Richmond Gas Companies' stock, amounting to $300,740, the trustees have in the different sinking funds for the redemption of the same, $178,913.76.

The net profits of the works during the past year were $5,394.40, making the accumulated profits up to the end of the year 1877, $3,068,338.15.

The profits this year are less than last year, for the following reasons: The appropriation made by councils for public lighting being $140,000 less than the year 1876. The amount received for gas for two months of that year was $2.30, and was reduced to $2.15 for the balance of that year, making the receipts $90,000 less than in 1876. The depression in trade and business has caused a falling off in the consumption of gas for private use alone amounting to 96,000,000 cubic feet. The reduction in the price of coke and tar this year amounts to $43,000.

The cost attending the rebuilding of the entire wharf at the Ninth Ward Works, the renewal of the retorts, consequent upon the heavy consumption during the Centennial, and the compulsory removal by order of the court of the lime-kilns from the Ninth Ward Works to the Point Breeze Works, thus adding largely to the expense for the year.

The average illuminating power of the gas made at the different works under the charge of the trustees during the year was 16.39 candles.

An Injunction against the Trust.—In the Common Pleas Court's office a bill in equity has been filed by J. M. Foster against the city and the trustees of the gas works. The complainants set out that they are the owners of a patent apparatus for regulating the pressure of gas and preventing its waste, etc., and have been and are selling them in this city to private consumers; that the trustees of the gas works have made an unreasonable rule requiring the attachments of the machines to be made at least a foot from the metre wherein the proper place to make the connection is at the outlet of the metre, and not touching the metre itself; that the rule heretofore has not been enforced and the trustees now propose to enforce it, and remove all machines that are connected with meters in violation of it, etc., and this plaintiff asked that they be restrained from so doing.

Baltimore Gas Light Co.—70 shares of this stock were sold on the 4th inst., in Baltimore, at $135 per share; closing, $130 bid and $135 asked. The gold certificates are quoted at 105@106 per cent.

Sharon, Pa., is being supplied with gas at $2.25 per thousand feet.

Boston Gas Light Co.—On the 26th ult. there were sales of 13 shares of this Company's stock; par $500, @$812.50.

Regulating the Price of Gas in California by Law.—A bill to regulate the price of gas, making it illegal to charge over $3 for 16 candle power, has recently passed the California Assembly.

AUCTION SALES.—*Manayunk* (*Philadelphia*) *Gas Co.*—2 shares; par $50, @$54 per share.

Germantown (*Pa.*) *Gas Co.*—41 shares; par $50, @$53½ per share.

New York Gas Light Co.—16 shares at $125½@$126 per share.

Lighting Chicago for 1878.—At a recent meeting of the Chicago Common Council, the sum of $325,000 was appropriated for lighting the streets of the city for the year 1878. The expenditures on this account for the two previous years, 1876 and 1877, were $230,500 and $215,242.30, respectively.

The following list of Companies in New York and vicinity is corrected weekly by GEORGE H. PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad street, New York:

COMPANIES IN NEW YORK AND VICINITY.	Capital Stock.	Par.	DIVIDENDS. Rate per ann.	Am. of last.	Date of last.	QUOTATIONS Bid.	As'd
	$		P. ct.				
Mutual, N. Y.	5,000,000	$100	10	2½	Jan., '78	86	88
" Gold Bds.	90,000	1,000	7	3½	Feb., '77	100	103
N. York "	4,000,000	.....	10	5	Nov., '77	120	124
Metrop. "	2,500,000	100	10	5	June, '77	131	133¾
" G. Certfs.	1,000,000	.....	7	3½	"	100	103
" Gold Bds.	500,000	1,000	7	3½	"	102	....
Harlem "	1,850,000	50	8	3½	Aug., '77	95	100
Manhat. "	4,000,000	50	.....‡	5	Nov., '77	205	210
Brooklyn, Bkln.	2,000,000	52	15	5	Dec., '77	155	165
Nassau, G. Bds.	1,000,000	25	.....‡	3	Jan., '78	70	80
" G. Certfs.	700,000	1,000	7	3½	July, '77	....	101
People's, G. Bds.	1,000,000	10	....‡	3½	July, '76	20	40
" G. Certfs.	300,000	1,000	7	3½	July, '77	80	85
" Gold Bds.	325,000	.....	7	3	Feb., '77	96	100
Metrop. "	1,000,000	10	5	2½	Nov., '77	68	72¾
W'msb'g "	1,000,000	50	10	2½	July, '77	115	120
" G. Certfs.	1,000,000	.....	7	3½	July '77	100	102
Citizens', G. Bds.	1,200,000	20	....‡	3	Jan '78	81	85
" G. Certfs.	320,000	1,000	7	3½	Oct., '77	97	100
J. C., N. J.	750,000	20	10	5	July, '77	160	....
Cen. Wstch. N.Y.	466,000	50	7	4	July, '77	75	85
Subur'n, "	295,000	50	7	3½	Oct., '77	....	95
Municipal, N. Y.	1,500,000	100	.....	.....	.....	90	100

‡ Paid irregularly.

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